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OCTOBER, 1907.

$2.00 per year.
$3.00 with Directory.

TEXTILE WORLD RECORD

Special Features.

International Cotton Conference at Atlanta.

Washington Meeting of the
National Association of Cotton Manufacturers.

Moisture in Worsted Yarn.

Mr. Coats Tells Why
The Price of Sewing Thread Has Been Advanced.

COPYRIGHT, 1907, LORD & NAGLE COMPANY, REG U. S. PAT. OFF.

Table of Contents, Page 73. Buyers Index, Page 215. Index to Advertisements, Page 225.

TS1300
.T36

The Textile-Finishing Machinery Co.

HOWARD BUILDING

STAIRWAYS, 83 EXCHANGE PLACE [ENTRANCES] ELEVATOR, 171 WESTMINSTER ST.

PROVIDENCE, R. I.

BUILDERS OF
ALL KINDS OF

MACHINERY

FOR

BLEACHING
DYEING
DRYING

AND

FINISHING

Singeing Machines,

Boiling Kiers,

Washers, Squeezers,

Chemic and Sour

Rusden Patent

Continuous Chainless

Steamer,

Aniline Agers,

Dyeing Machines,

Open Soapers,

Blanket Washers,

Color Kettles,

Horizontal or Vertical Drying Machines, with Copper or Tinned Iron Cylinders.

Automatic Tentering Machines,

Water and Starch Mangles,

Dampening Machines,

Dyeing Machines for Chain Warps.

Calenders for Rolling, Glazing, Chasing and Embossing, also Calenders for Moire Finish.

Sole Manufacturers of Patented Flexible Cloth Expander for Cylinder Drying Machines, Calenders, Mangles, &c.

Patent Combination Rolls Made of Cotton and Husk, especially adapted for Soft Finish, Unequalled for Elasticity and Durability.

Cotton, Paper, Husk, Chilled Iron, Brass and Rubber Rolls, Electro-deposited Copper Rolls for all Purposes.

Padding and Drying Machines for Shade Cloths.

Single and Double Cylinder Engines.

Hydraulic Presses and Pumps.

Mercerizing Machinery for Piece Goods and Yarn in the Warp or Chain

ALL KINDS OF OUTFITS FOR BLEACHING THREAD AND SOFT TWISTED YARN.
BLEACHING MACHINERY FOR YARNS IN THE WARP OR CHAIN.

Estimates, Drawings and full particulars of complete plants furnished on application.

Southern Agent, STUART W. CRAMER, Charlotte, N. C., Equitable Building, Atlanta, Ga.

Stuart, Oct. 10, 08

17

435
Art 21

Calender and Mangle Rolls

49

COTTON

PAPER (LINEN, COTTON OR MANILLA)

FELT PAPER

COMBINATION (COTTON AND HUSK)

COMBINATION (COTTON AND EXCELSIOR)
PATENTED

HUSK

FIBRE

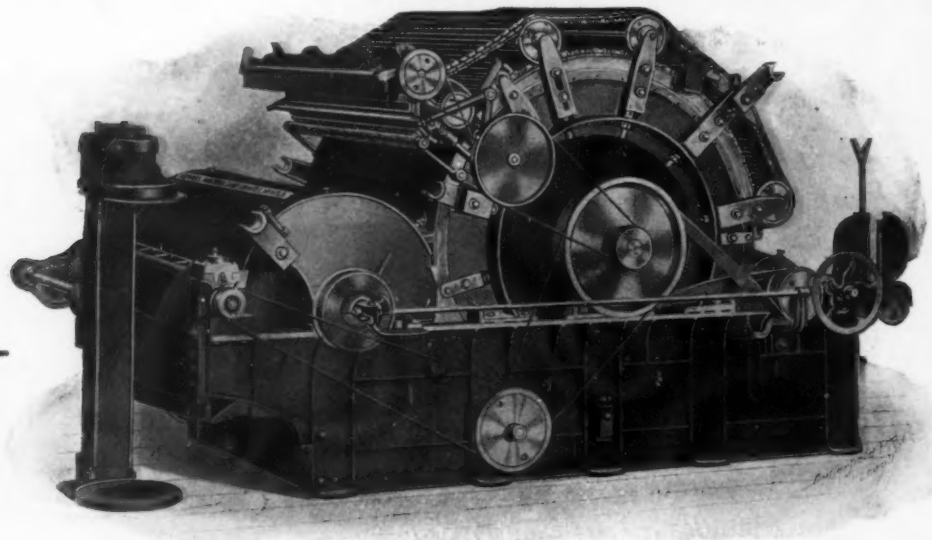
BRASS CHILLED IRON RUBBER

H. W. BUTTERWORTH & SONS CO.

PHILADELPHIA, PA.

BLEACHING, DYEING, DRYING AND FINISHING MACHINERY FOR SILK, COTTON AND WORSTED FABRICS.

Sewing Oct 10. 08



Cotton and Worsted Machinery

With Modifications to Suit Any Class of Work.

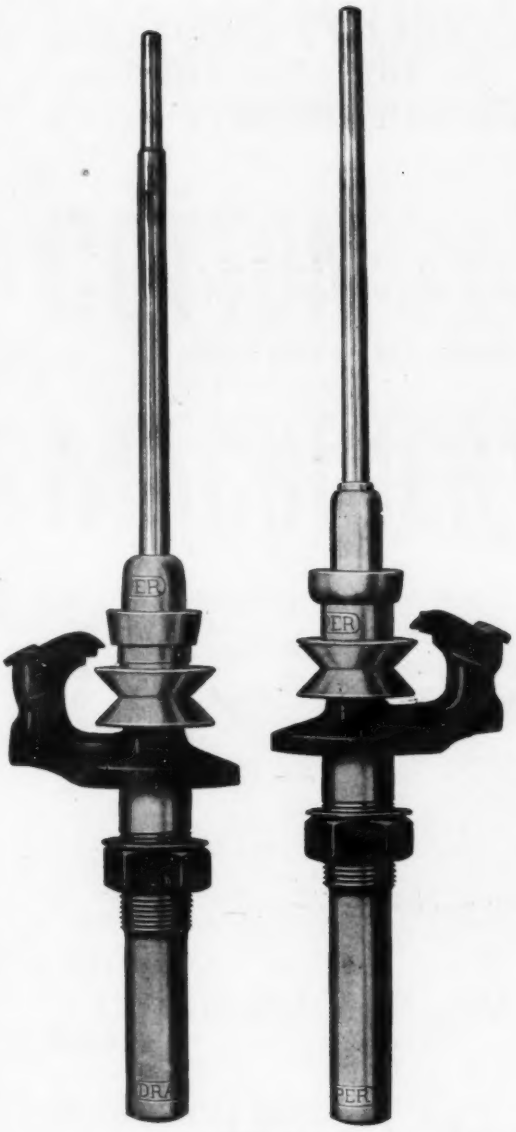
Cotton Machinery: Cards, Railway Heads, Drawing Frames, Fly Frames, Speeders, Ring Spinning Frames, Twisters, Spoolers, Reels, Warpers, Slashers, Winders, Looms, Shearing Machines, Balling Machines, Folders, Stamping Machines, Sewing Machines, Size Pumps, Size Kettles, Drawing-in Frames, Baling Presses, Indigo Grinders.

Worsted Machinery: Spinning Frames with caps, rings or flyers, Dandy Rovers and Reducers, Cone Second Finishers, Reducers and Rovers, Gill Boxes for Drawing, Preparing and Finishing, Weigh Boxes and Drawing Boxes, Cap Trap, Flyer and Ring Twisters.

Plans, Specifications and Estimates furnished upon application.

Lowell Machine Shop

LOWELL, MASS.



Two New
Large Size
Spinning Spindles.

We make

Draper,
Whitin,
McMullan

and other
types of

Spindles;

also

Northrop Looms,

Twisters,
Warpers,
Spoolers,
Reels,

Banding Machines,

etc., etc.

Draper Company,
HOPEDALE,
MASS.

THE EMPHATIC SUCCESS OF OUR "IDEAL" AUTOMATIC LOOM IS DUE TO SEVERAL SALIENT POINTS OF SUPERIORITY OVER ALL COMPETITORS:

1st. The ease and smoothness with which they start up.

2d. The acknowledged superiority of the cloth woven.

3d. Simple and thoroughly mechanical construction, assuring freedom from the constant breakage and expensive repairs attending other automatic looms.

4th. No special bobbins, shuttles or other expensive parts.

5th. Ability to use cop or bobbin filling interchangeably.

6th. Superiority of warp stop motion which does not break or fray the softest yarn.

7th. Of the thousands in operation not a single bobbin or crank shaft broken.

IN PROOF OF CLAIMS WE POINT TO THOSE MILLS FORMERLY USING OUR COMPETITORS' LOOMS THAT ARE NOW USING OURS.

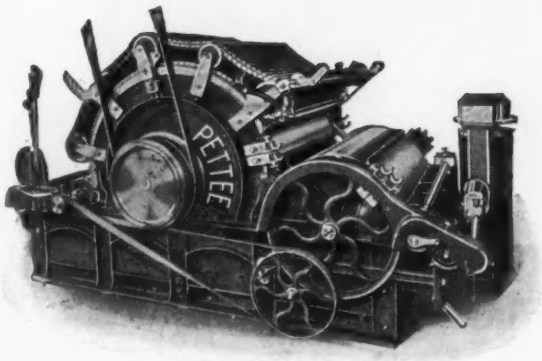
The Stafford Company

Readville, Mass.

Saco and Pettee Machine Shops

NEWTON UPPER FALLS, MASS., U. S. A.

COTTON MACHINERY



Revolving
Flat Cards,
Drawing
Frames,
Railway Heads,
Slubbing,
Intermediate
and
Roving
Frames,
Spinning Frames,
Spoolers
and
Reels.

Shops—

Biddeford, Me.

Newton Upper Falls, Mass.

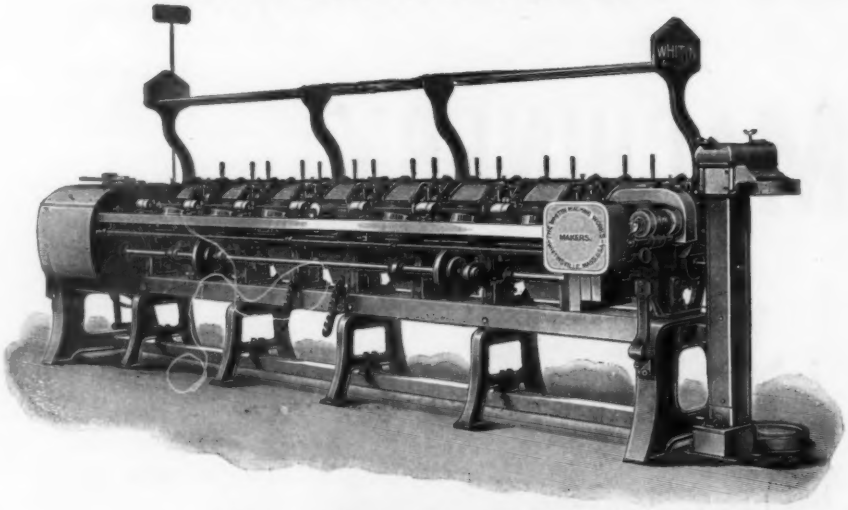
Southern Agent, A. H. WASHBURN, Charlotte, N. C.

THE

WHITIN MACHINE WORKS,

Cotton Machinery

WHITINSVILLE, MASS.



HIGH SPEED COMBER 1906 MODEL.

Revolving Flat Carding Engines,
Sliver Lap Machines,
Ribbon Lap Machines, Combers,
Railway Heads, Drawing Frames,
Spinning Frames, Spoolers, Twisters,
Long Chain Quilling Machines, Reels, Looms.

Southern Agent,
S. W. CRAMER

Trust Building, CHARLOTTE, N. C.
Equitable Building, ATLANTA, GA.

"Kitson Products"

Blowing Systems

For Conveying Bale Cotton
from Storehouse to Picker-room

Self-Feeding Openers
Lappers and
Cleaning Trunks

Waste-Working Machinery

Raw Stock Cotton Dryers

We own the Patterns and can furnish REPAIR PARTS for PICKERS
formerly built by

WHITEHEAD & ATHERTON, . Lowell, Mass.
ATHERTON MACHINE CO., - - Lowell, Mass.
A. T. ATHERTON MACHINE CO., Pawtucket, R. I.

Kitson Machine Shop

Lowell, Mass.

SCOTT & WILLIAMS

2079 E. Cumberland Street, Philadelphia, Pa., U. S. A.

BUILDERS OF

Full Particulars, Samples nnd Special Catalogues on Application.

Rib Knitting Machinery for Underwear and Hosiery

Plain, Single Lever or with Welt, Slack Course and Automatic Slackening Device for Welt.

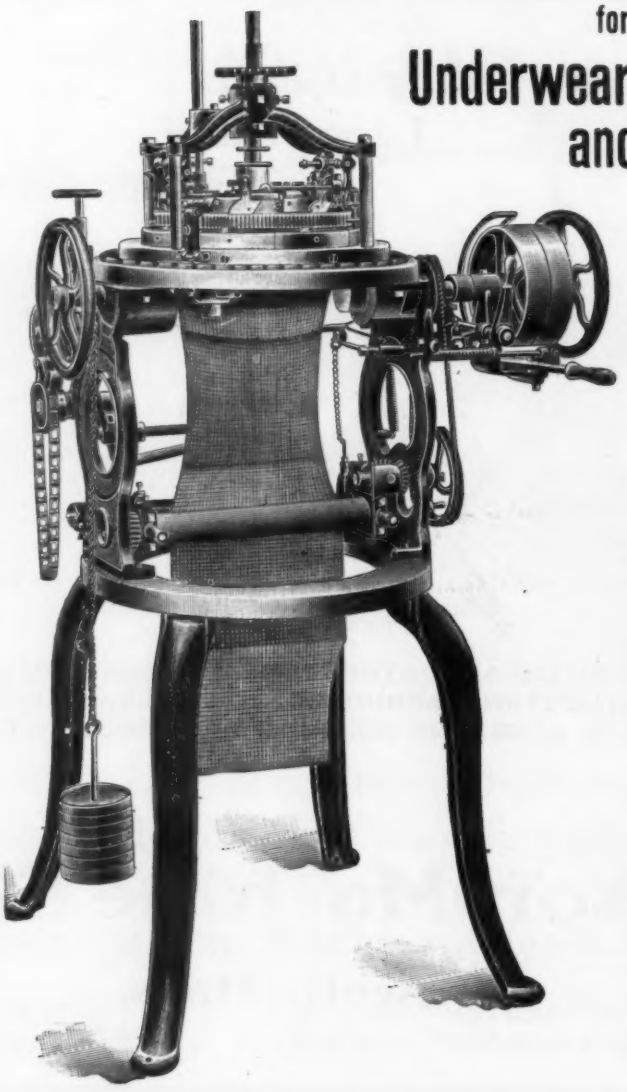
Improved Measuring Device, by actual length knit.

Sizes 8 to 24 inches, inclusive, varying by one inch.

Number of Feeds, 4 to 12, according to style and diameter of machine.

Solid Forged Steel Cylinders, specially hardened or with patent inserted walls for fine fabric.

Special Machinery for Sweaters, etc.



The illustration shows our

Improved High Speed Single Lever Automatic Ribbed Underwear Machine

for making ladies' and gents' ribbed underwear, union suits, etc., plain and shaped.

We build Loopers, Ribbers and other Machinery for Knitting Mills

As well as

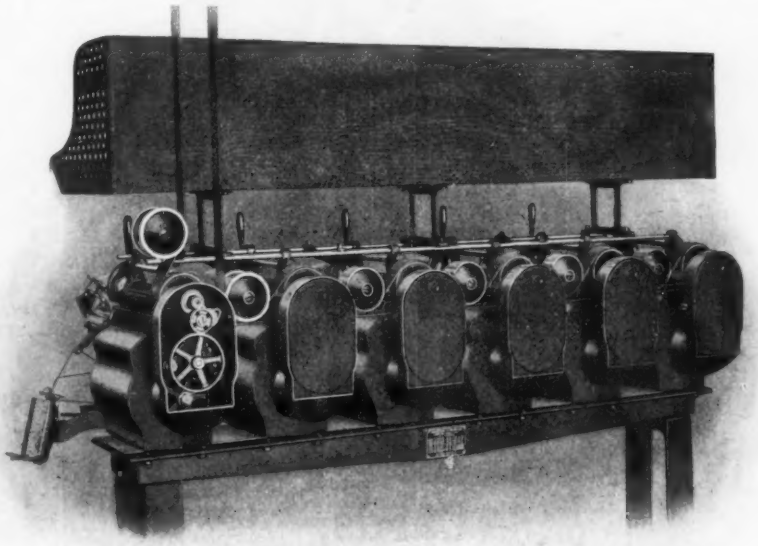
A Complete Line of Full Automatic and 7-8 Automatic Seamless Hosiery Machinery.

The Nutaper Cone

is wound on correct principles because, having uniform taper throughout,

A. the yarn is not packed hard at the apex and soft at the base, and

B. the yarn near the tube, which owing to decreased "ballooning" causes trouble in knitting from ordinary taper, delivers without a catch.



No. 50 "fixed-gain" device insures correct spacing.

Universal Winding Company

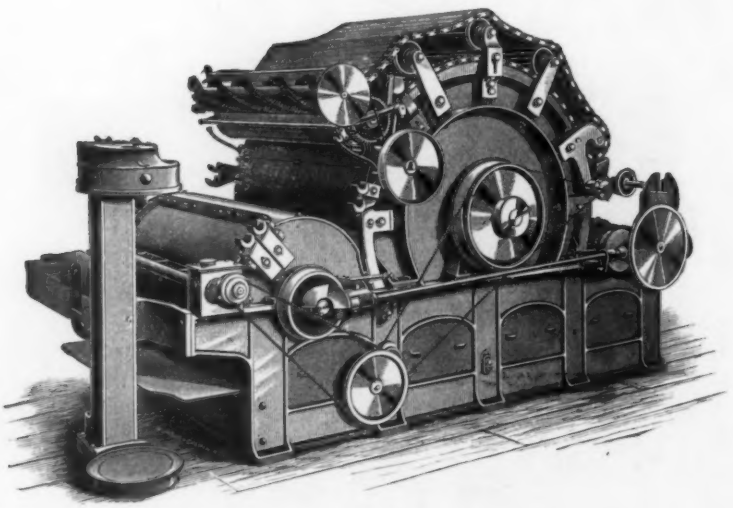
BOSTON

Cotton Machinery

MASON MACHINE WORKS,

TAUNTON, MASS.

Southern Office,
Charlotte,
N. C.



Cards,
Combers, Railway
Heads, Drawing Frames
Spinning Frames, Mules and Looms

INCLUDING

Plain and Fancy Silk Looms

EVAN ARTHUR LEIGH

232 Summer Street (opposite the South Station), Boston, Mass.

SOLE AGENT

IN THE UNITED STATES AND CANADA FOR

Platt Bros. & Co., Ltd.

BY FAR THE LARGEST MAKERS IN THE WORLD OF

Cotton, Woolen and Worsted Machinery

Platt's Patent Opening and Picking Machinery.
Platt's Cotton Comber will comb from 7-8" stock to Sea Islands.
Platt's Special Machinery for Making Cotton Waste into Yarns.
Platt's Special Machinery for Making French Worsted Yarns.
Platt's Woolen and Worsted Carding Engines, Special Designs.
Platt's Cotton, Cotton Waste, Woolen and Worsted Mules.

MATHER & PLATT, LTD.

Dyeing and Finishing Machinery.
Archbutt-Deeley System for purifying and softening water.

TEXTILE MACHINERY ASSOCIATION, LTD.

Flax, Hemp and Jute Machinery.

GEORGE HODGSON, LTD.

Looms for Worsteds, etc.

THE PATENT AUTOMATIC FEEDING MACH. CO., LTD.

Patent Feeding Machines for wool, cotton, flax, fur and fibrous material.

JOSEPH SYKES BROS.,
Card Clothing for Cotton.

JAMES CRITCHLEY & SON'S,
Card Clothing for Woolen and Worsted.

DRONSFIELD BROS'.

Grinding Machinery and Emery Filleting. The Best French and English Combing and Rubbing Aprons. Harding's Pins and Circles. Varey's Fallers, etc.

Jacob K. Altemus is

Able to supply the best

Cop Winding Machinery

Or Hosiery Winders and more in particular

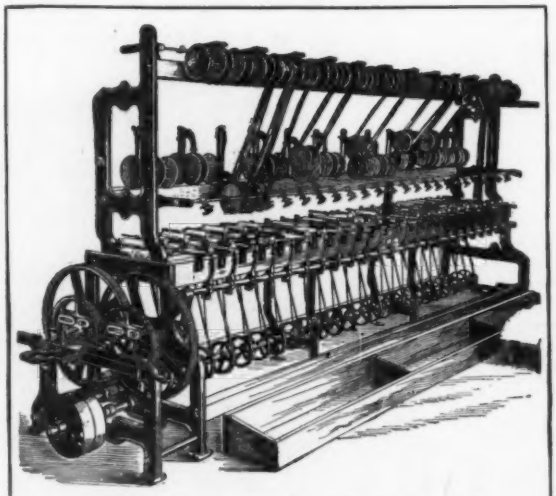
Bobbin Winders,

Keep in mind that I

Always produce machines that are right

Letting nothing go out

That is not satisfactory before delivery.



The Greatest Bobbin Winder for Skeins Ever Built.

Every

Manufacturer should investigate warping and beaming machinery, warp splitting as well,

Upright Spoolers, Quillers, Warpers, Twisters, etc.

Send for full information and prices.

Textile Machinery

2824 N. 4th St., Philadelphia, Pa,

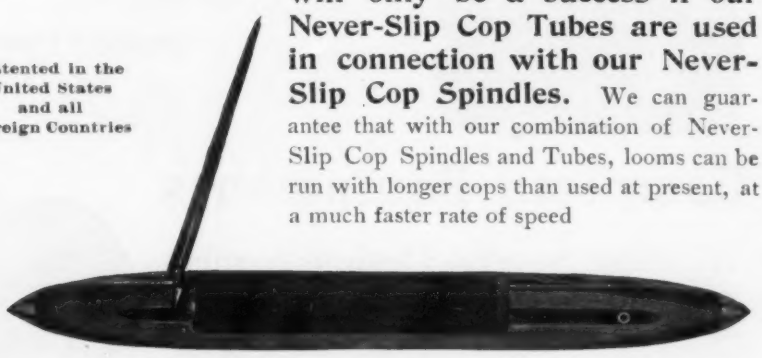
Shuttles for all Textile purposes and Sundry Special Loom devices

Never=Slip Cop Spindles and Tubes

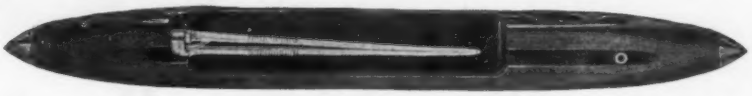
Never-Slip Cop Tube
Patent applied for

Filling-Waste is reduced to nothing and long Cops will only be a success if our Never-Slip Cop Tubes are used in connection with our Never-Slip Cop Spindles. We can guarantee that with our combination of Never-Slip Cop Spindles and Tubes, looms can be run with longer cops than used at present, at a much faster rate of speed

Patented in the United States and all Foreign Countries



Shuttle with Spindle Raised
U. S. Patents: 778851, Jan. 3, 1905; 790611, May 23, 1905; other patents pending



Shuttle with Spindle Lowered.
U. S. Patents: 778851, Jan. 3, 1905; 79611, May 23, 1905; other patents pending

Write for Catalog

American Textile Specialty Machinery Co.

363-373 Rider Avenue, New York City
NEAR MOTT AVENUE SUBWAY STATION

Electric and Automatic
Warp Stop Motion for Silk, Wool and Cotton
Simplicity! *Perfection!*

TURBINE WATER WHEELS

HUNT-McCORMICK

Cylinder or Balance Gate Casing

Least Water,
Greatest Power,
Uniform Speed

Complete Equipments

We make Special Designs to meet TEXTILE MILL conditions.

FLUMES, REGULATORS,
SHAFTING, PULLEYS, GEARS,
CLUTCHES, HANGERS, ETC.
UNDER-WRITER FIRE PUMPS.

Wet Finishing Machinery

Fulling Mills——Washers
Dyeing and Bleaching Machines
FOR WOVEN AND KNIT GOODS

Dye Tubs—Soap Tanks—Centrifugal Pumps

RODNEY HUNT MACHINE CO.

Branch Office: 70 Kilby St., Boston. Works: Orange, Mass.

JAMES HUNTER MACHINE CO.

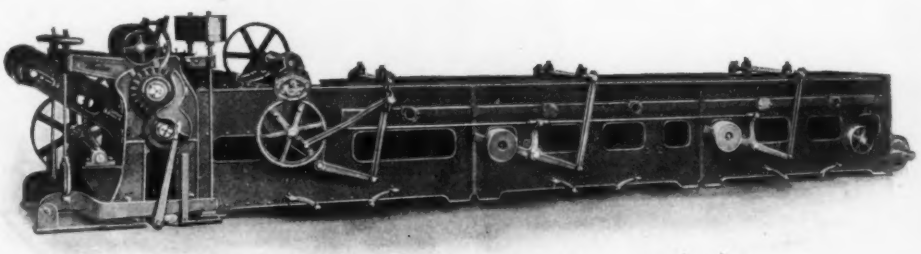
NORTH ADAMS, MASS., U. S. A.

Wool Washers. *Bulletin 54*

The Hunter

MODEL D

WOOL WASHER



Parallel Rake.

Bowls 36″ or 48″ wide; 16-24-32 and 40 feet long.

Better work and more of it.
Large Setting Bowl giving clean scouring liquor.

Better investigate.

EASTON & BURNHAM MACHINE CO.

PAWTUCKET, R. I.

SPOOLING & WINDING MACHINERY

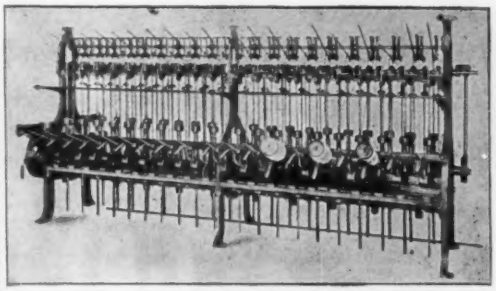
TEXTILE ART PRESS, N.Y.

OSWALD LEVER CO.

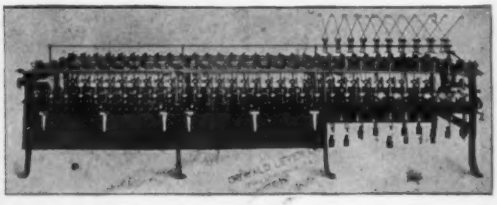
(Formerly LEVER & GRUNDY.)

MANUFACTURERS OF TEXTILE MACHINERY AND SOLE MAKERS OF OUR PATENTED SPECIALTIES IN THE UNITED STATES.

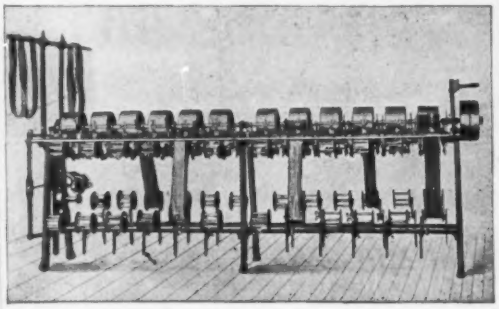
Conical and Parallel Tube Winding Machines; Warping Machines and Creels; Brass Bobbin Winding and other Machinery for lace mills; Chenille Cutting Machines, Sectional Warping Mills, Beaming Machines, etc.



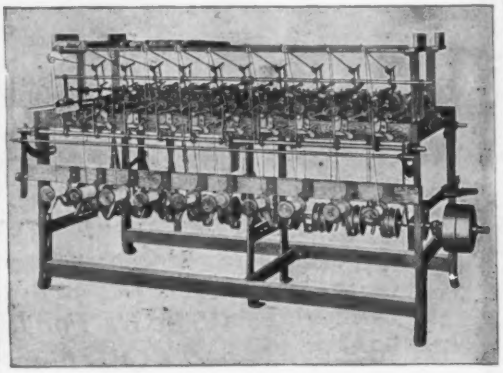
Vertical Spindle Gear Driven Winder, as used by all manufacturers of heavy duck, jute, cotton bagging and carpets.



Silk Winder to wind on Quills, Paper Tubes or Butts. The finest of cotton or silk.



Pressure Drum Spooling Machine. This machine is adapted for spooling any kind of yarn, whether from mule cops or skeins.

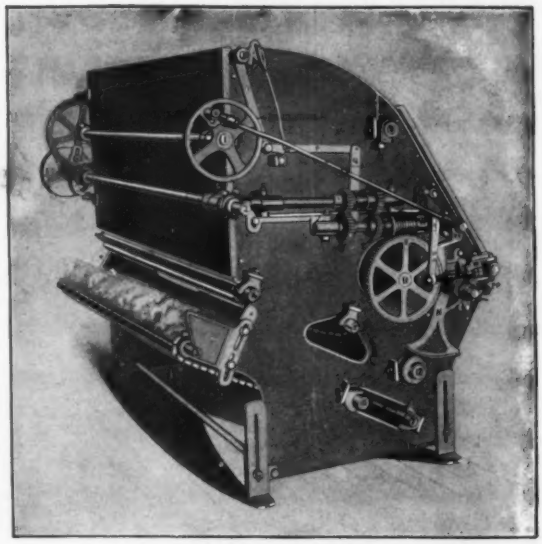


This Machine may be arranged to wind from skeins, spools, cones, or any kind of spinning bobbins. Most suitable machine for cotton or woolen blankets.

Cop Winding Machines for butts to weave from outside; Filling Bobbin or Quill Winding Machines; Vertical Spindle Spooling Machines for Silk, fine cotton, wool and worsted; Variable Speed Bobbin Machines for large bobbins used in knitting mills; Dresser Spooling Machines; Reeling Machines.

Lehigh Ave. and Mascher Sts., PHILADELPHIA, PA., U. S. A.

THE FISHER PATENT CARD FEED



Write Us For List of Mills Where Machines Are Used.

Woonsocket Machine and Press Company

WOONSOCKET, R. I.

It's the Comb

The Comb Opens Out the Cotton

This enables us to place the specially shaped bars closer together. This means saving cotton, yet getting better cleaning. When you save cotton you save the cost of labor, power etc., expended upon it.

The Picker Room is the place to get the dirt out—not the Carding room—this is what the Schaellibaum Patent Grid does.

That's Why

The Schaellibaum Patent Grid

The Grid with a Comb.

Does better work than any other and helps your profits. There are other reasons which are set forth in our booklet, "More Yarn and Better." Write for it.

Write us in either English, French, German, Spanish or Italian.

The Rob. Schaellibaum Co., 288 Dyer Street

Providence, R. I.

Manchester, England Mulhausen, Germany Bombay, India

The Sentinel
Electric Warp Stop Motion

with spring wire detector head for plain weaves.

Each detector wire controls two threads making this Stop Motion especially adapted for high sley goods. The position of the broken end is distinctly indicated.

WE CALL SPECIAL ATTENTION TO OUR

New Drop Wire Warp Stop Motion

for both plain and fancy weaves

Each detector wire controls a single thread and clearly indicates the position of the broken end. By a new form of drop wire, positive contact is assured and maintained, insuring instant stopping of the loom.

American Textile Appliances Co.

79 Milk Street, Boston, Mass.

William Firth, Treasurer

B V C
TRADE MARK

An average of 10,750 knots hour by hour for each of the

10

Barber Warp Tying Machines

shipped in this car.

This average will be increased, as the operators acquire skill and experience. Here are the figures for week ending Sept. 21

W. T. M.	No. 1.	526750 ends in 49	hrs.	W. T. M.	No. 6.	521250 ends in 42½	hrs.
	2.	374500 " 37¾	"		7.	442750 " 42¼	"
	3.	241500 " 24½	"		8.	463750 " 45	"
	4.	523250 " 47	"		9.	463250 " 42	"
	5.	444500 " 40½	"		10.	465500 " 45	"

This table of production proves these machines have justified the foresight that ordered them, and incidentally, that the Barber Warp Tying Machine is daily exceeding our advertised rate of 10,000 knots hour by hour.

The Barber Warp Tying Machine is now working on so many different styles of warps we can undoubtedly refer you to some mill manufacturing goods similar to your own. You can judge then for yourself If you have not already seen it in operation, we will gladly arrange an appointment for you, and we trust you will allow us the opportunity of so doing.

Barber- Colman Company

77-79 North Washington St. (Cor. Thacher), Boston, Mass.

Insurance Against
Loss of Profits

Is there a fly-wheel in your mill?

Suppose it should burst and demolish the building and delicate machinery?

Machinery cannot be replaced quickly. In fact, it usually takes months to replace. Where it is of a special type, or designed for a special purpose, the delay is of course much greater.

Meanwhile what is happening to your business?

Your plant is idle; no goods can be made. Just think what an enormous loss you will suffer if the output of your mill is even as low as $150 per day.

Why not protect yourself by insurance?

Maryland Casualty Company is now covering this loss by special endorsement attached to its Fly-Wheel Insurance policy. The indemnity payable under this indorsement is not deducted from the face value of the policy, but is a separate insurance which the Company pays in addition to the face value of the policy. This is really the greater loss from fly-wheel explosion. Protect yourself in time.

Write us for full particulars, giving amount of insurance desired, number and diameter of the fly-wheels and pulleys you want covered. We will quote rates by return mail. Ask for form 237–G descriptive of this insurance.

Maryland Casualty Company
Baltimore, Maryland

The Maryland continues to sell, at fair rates the Standard form of liability policy, which is as good as the best sold by any other company.

The Company also writes Burglary, Sprinkler Leakage, Teams, Elevator, Personal Accident, Steam Boiler, Water Damage, Physicians' Defense, Plate Glass, Disability, Automobile, Health, Fly-Wheel, and all other classes of casualty insurance.

Assets over
$3,691,447.50

MARYLAND CASUALTY COMPANY
MERITS COMPLETE CONFIDENCE

Surplus to Policyholders
$1,722,046.77

PRACTICAL FIRE PROTECTION

If you want your mill buildings properly protected against the fire hazard, thereby obtaining the lowest insurance rates, you must have a supply of water which is instantly available under high pressure and absolutely independent of the successful or immediate operation of pumps or other machinery. The old method of storing such a supply was by wood tanks, generally built on top of buildings. As these tanks are short lived they soon become, themselves, a menace to the building instead of a protector. The sudden bursting of such a tank has often done as much damage as a fire. The up-to-date method of storing water is by means of a steel tank on a steel tower. We make a specialty of the design, manufacture and erection of these tanks of any desired capacity, in any part of the country, to meet any local conditions. Our tanks are recommended by the Factory Mutual Insurance Companies and endorsed by all of our past customers. We have built about seven hundred towers and tanks in all parts of the country, about 50 of which have been erected for Textile Mills. Every one of these is giving satisfaction. Write for booklet No. 7 which gives a list of all our customers with whom we invite you to correspond. The cut shows a tank which we built for the Belton Cotton Mills, at Belton, S. C. The large tank is kept full at all times for fire protection; the small one supplies water for use in the buildings.

Chicago Bridge and Iron Works

105th and Troop Sts. Chicago, Ill.

The Ideal Motor Drive

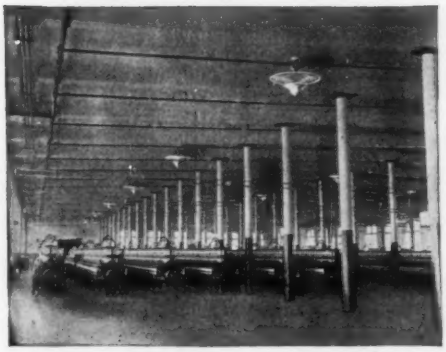
A New Process Noiseless Pinion
and an Accurately Cut Metal Gear

We make them both. Write for Catalogue.

THE NEW PROCESS RAW HIDE CO.
SYRACUSE, N. Y.

General Electric Company

Electric Lighting for Textile Mills



Spinning Room, Hoskins Mill, Charlotte, N. C.—Lighted by 20 G. E. Arc Lamps with Concentric Diffusers.

Textile Mills require copious, brilliant lighting—white as sunlight to render true color values.

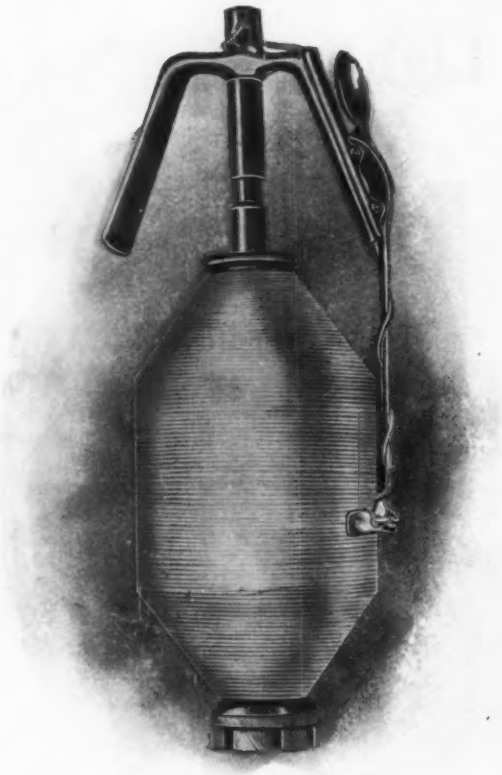
Such results are attained at the highest efficiency and with lowest operating cost by G. E. arc lamps with concentric diffuser reflectors producing a pure, evenly distributed light—in effect artificial daylight.

Our Illuminating Engineering Department renders the same efficient service in lighting as our Mill Power Department has exhibited in 13 years of successful work in the application of electric power to the textile industry.

Mill Power Office, 84 State St., Boston **Principal Office: Schenectady, N. Y.** Sales Offices in all large cities.
NEW YORK OFFICE, 44 Broad Street. BALTIMORE OFFICE, Continental Trust Bldg.
PHILADELPHIA OFFICE, Witherspoon Bldg. ATLANTA OFFICE, Empire Building.

THE DUNN FLYER

PERFECTED



We show above our 7x4 bobbin as made on a 7x3½ Fly Frame

FIFTEEN PROVED ADVANTAGES

Textile Machinery Co.

60 INDIA ST., BOSTON,
MASS.

Rubber Covered Rollers

New rollers complete. *Old roller bodies recovered*

This work has for many years been one of our leading specialties. Most of the prominent mills which bleach, dye, finish or print goods, use our rubber covered rollers, *because*

they excel { in strength and style of construction / in the quality of the rubber covering / in the length and quality of the service which they render }

We are prepared to furnish rollers with rubber coverings that are properly adapted for any and all purposes

Rubber Belting for Power Transmission and Conveyors—**Hose** for water, steam, air, acids, and fire protection,—Rod and Sheet **Packings** in great variety

MANUFACTURED BY

BOSTON BELTING COMPANY

James Bennett Forsyth, Mfg. Agent and General Manager

BOSTON	NEW YORK	BUFFALO	PHILADELPHIA	BALTIMORE
256-260 Devonshire St.	100-102 Reade St.	90 Pearl St.	722 Arch St.	119-21 E. Lombard St.

Adulteration of Starches

Extracts from report of the

North Carolina Department of Agriculture

on their investigation of this important matter

Eighty mills were requested to send in a sealed package samples of starch used giving name of the manufacturer. In response to this request hundreds of samples were received and examined both chemically and microscopically to determine whether the starch was what it was claimed to be.

Of the samples sent in said to be potato starch, 66% were found not to be potato starch, but made up almost entirely of cheaper material.

Samples sent in by mills using
POTATO STARCH

Sold by

Eustis, Pennock & Co.

33 Broad Street, Boston

Were found to be

Pure Potato Starch

and nothing but Potato Starch

The demand for good weaving machinery is unprecedented.

The demand for poor weaving machinery is always dull.

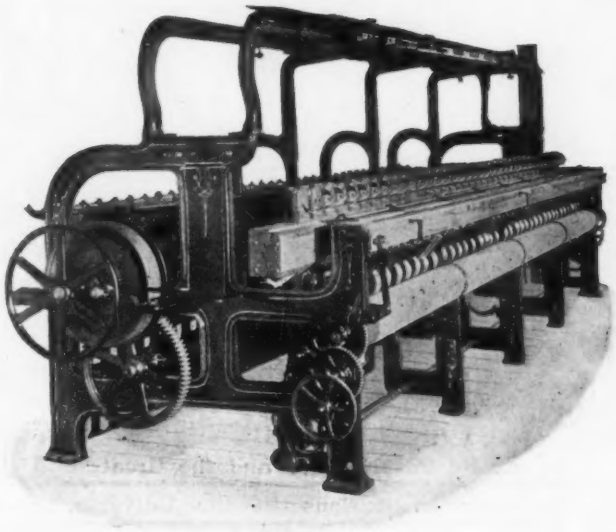
The capacity of our works is taxed to the utmost.

This testifies to our high standard of excellence.

Cotton Looms

Silk Looms

Box Motions



Patten's Improved Dobby Jacquard Machines

Latest Narrow Fabric Loom.

Your inquiries appreciated. *Correspondence solicited.*

Kilburn, Lincoln & Co.,

Fall River, Mass.

Southern Agent

O. A. ROBBINS,

Charlotte, N. C.

The machine with a Brain—Nothing else like it in the world.

"The Millionaire" Calculating Machine

Multiplies, Divides, Adds, Subtracts

Giving infallible results with wonderful speed and and minimum of trouble.

Example:

18,769,423
x
23,769,814
Equals:
446,145,693,597,322.

Result obtained in 9 to 10 seconds with only eight turns of the crank —not possible with any other machine known.

In use by Governments and the Greatest Business Institutions in the Universe,

saving its cost many times over every year and so increasing the output of results as to literally accomplish the work of three days in one,

A bright office boy can accomplish more with it than two or three expert accountants can without it.

The Millionaire Calculating Machine works out every possible calculation in the four rules of arithmetic, and does it with marvelous speed and unfailing accuracy.

It has fairly earned the title of a "Machine with a Brain." A valuable time-saver, labor-saver and money-saver in Textile Mills, Government, Railway and Insurance offices; in State Insurance Departments; Treasurers', Registrars', Auditors', and Tax offices; in census departments, ship-building concerns, engineering operations, contracting offices, Banking and Trust Companies, in commercial houses for *Bill Extensions* and for every other form of calculation, simple or compound.

Simple and durable in construction—easy to learn—easy to operate.

It has stood the test of time.

Our list of users is our best advertisement.

Take the first step in cutting down your office expense to-day by sending for free Booklet.

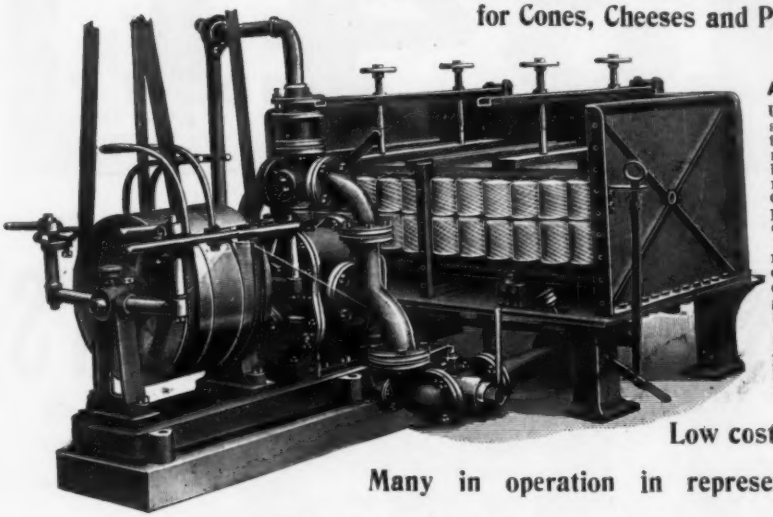
W. A. Morschhauser, Sole Agent for North America

Metropolitan Life Building, New York

Cross Spool, Skein and on the Beam

Dyeing and Bleaching Machine

The Latest and Most Successful for Cones, Cheeses and Parallel Tubes



ADVANTAGES: Uniform bleaching and dyeing throughout. Colors requiring several baths dyed without removing bobbins. Good for fast sulphur black and all colors. little dye liquor needed; none lost. Bobbin deformation avoided, consequently good running off. Simple and accurate sampling, large production, little power. Very little attention needed.

Low cost—high quality

Many in operation in representative mills

German Textile Machinery of all kinds.

Sachsische Mach Fabrik (Rich. Hartmann) Chemnitz. **Carding, Spinning, Weaving** Machinery. Furnish complete outfits for waste and short staple cottons for blankets, flannelettes, merino and melange yarns, latest improvement. Employ over 6,000 people. **Can fill large orders in short time.** Special machinery for spinning filling on condenser card system.

Carl Hamel, Chemnitz. **Spinning** and **Twisting** Machinery. Plain and fancy yarn, cotton, worsted, etc.

Zittauer Machine Works, Zittau, Saxony. **Bleaching, Dyeing** and **Finishing** Machinery.

Erckens & Brix, Rheydt, Germany, build the well-known Cross Wound Bobbin **Bleaching** and **Dyeing** Machines. Also for Skein and on Warp Beams, etc. (See cut above.)

Fr. Gebauer, Berlin. All kinds of **Finishing** Machinery, Calenders, etc.

G. Anton Seelemann & Sohne Neustadt Orla, Patent Curved **Napper-wire,** etc.

Electrolyte **Bleaching Apparatus.**

L. H. A. Schwartz & Co. 141 Milk Street, Boston

Sole and direct agents for R. & O. Lindemann's Egyptian Cotton

East Indian and American Cottons

German Textile Machinery Specialties

Reproduction of the number plate of one of a recent U. S. order for

NASMITH COMBERS

"One machine instead of two"

Mills in the United States using Nasmith Combers.
(Showing many repeat orders.)

Name of Mill.	Orders	No. of Combers	Name of Mill.	Orders	No. of Combers
American Thread Co.	2	14	Lincoln Mfg. Co.	1	1
Berkshire Cotton Mills	1	3	Lorraine Mfg. Co.	2	12
Bristol Mfg. Corp.	2	36	Merrimac Mfg. Co.	1	6
Butler Mill	8	28	N. E. Cotton Yarn Co.	7	122
Chadwick Bros., Ltd	1	1	Soule Mill	4	18
Clark Thread Co.	3	58	Skenandoa Cotton Co.	2	6
Dartmouth Mfg. Corp.	2	4	Troy Knitting Co.	1	6
Fitchburg Yarn Co	1	24	Wamsutta Mill	3	12
Grant Yarn Co.	4	18	Warren Mfg. Co.	2	36
Hamilton Mfg. Co	1	24	West Boylston Mfg. Co.	3	48

STEPHEN C. LOWE

186 Devonshire St., Boston, Mass.

AGENT FOR

John Hetherington & Sons, Ltd., Manchester, England

MAKERS OF TEXTILE MACHINERY.

Full Line of Parts Constantly in Stock.
Send for Catalogues.

Leading mills have ordered within the past few days

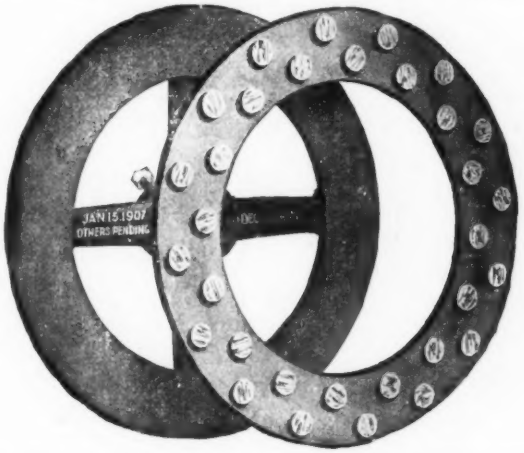
750

"Ready-to-Use"

Cork Insert Fibre Rings

They transmit more power, pick up quicker, are not affected by oil, water or dust, and last much longer than leather-facings.

Require no repairs



Need no cleaning

Easily attached to looms now in use, at small cost.

14 in. and under, $1.00, Over 14 in. to 16 in. inclusive, $1 25. Over 16 in. special prices.

In ordering, please give outside diameter and width of face.

Cork Inserts are used in 60 mills

American Woolen Co.
Wood Worsted Co.
Washington Mills
Burlington Mills
Weybosset Mills
Vassalboro Mills
Puritan Mills
Saranac Mills
Assabet Mills
Glen Worsted Mills
Amoskeag Mfg. Co.
Liberty Silk Co.
Sterling Mills
Shirreffs Worsted Co.
Wm. Tinkham Co.
Geo. H. Gilbert Mfg. Co.
Brightwood Mfg. Co.
Tioga Silk Co.
Pacific Mills
Walworth Bros.
Comins & Co.
New England Co.
Arlington Mills
Geo. E. Kunhardt
Chelsea Fibre Mills
Scherr Bros.
American Felt Co.
Givernaud Bros.
Oneko Woolen Co.
Elm Mills Woolen Co.
The Warren Woolen Co.
Appel Bros. Mfg. Co.
U. S. Bunting Co
Colwell Worsted Mills
Tremont Worsted Co.
Rock Mfg. Co.
Excelsior Mills
E. & H. Simon
Oakland Worsted Co.
Crown Mills
Andrews Mill Co.
Phoenix Silk Mfg. Co.
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Standard Silk Co.
Pequea Mills
The Vernon Woolen Co.
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Landenberger Mfg. Co.
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Kezar Falls Woolen Mfg. Co.
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Miami Woolen Mills
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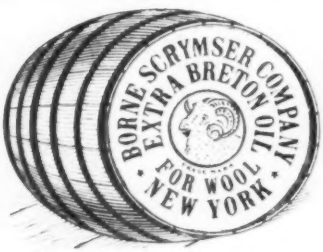
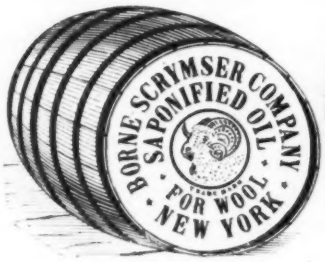
National Brake & Clutch Co., 16 State St., Boston





Over 100,000 barrels of

BRETON OILS FOR WOOL

have been used for all kinds of Wool Batching

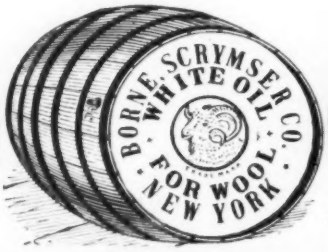
These oils are manufactured at our own works from the finest material with careful laboratory tests and there is a grade for every textile requirement. Tell us about your goods and we will tell you about the right "Breton."

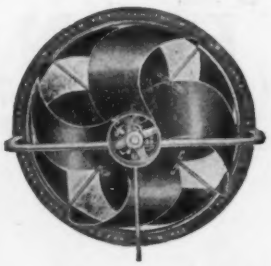
You take no risk—sold subject to test.

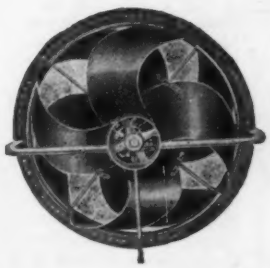
Borne, Scrymser Company,

80 South Street, New York.

Boston, Fall River, Philadelphia. Works:—Claremont, N. J.







Barney Compound Ventilating Fans

furnish a saving and satisfactory solution of drying, heating, cooling and ventilating problems in all kinds of Textile establishments.

They are a distinct type and are guaranteed to do the work.

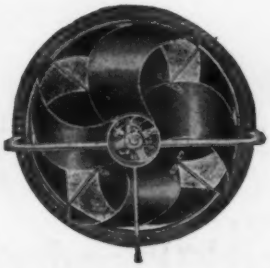
Ideal for use in Dye Houses, Weaving and Carding Rooms.

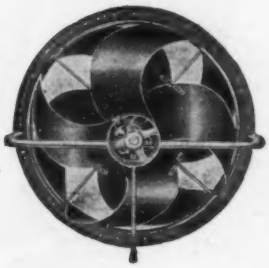
Our engineers will originate the proper method to meet your needs and we will allow 30 days trial.

Write right now.

Barney Ventilating Fan Works,

24-28 Binford St., Boston, Mass.

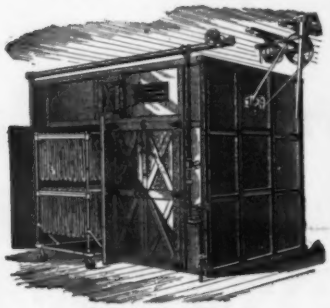




"HURRICANE" DRYERS AND FANS

For Wool, Cotton Stock, Yarn, Stockings, Underwear, Etc.

Power Screw, Hydraulic and Lever **Presses**



Truck Yarn Dryer.

BELT DRIVEN AND MOTOR DRIVEN

"Hurricane" Fan, Style No. 2. Write for Catalogues.

COMPLETE EQUIPMENTS FOR DYEING, SCOURING, BLEACHING, CARBONIZING, OXIDIZING, CHROMING, Etc.

PHILADELPHIA DRYING MACHINERY CO.

6721 Germantown Ave., Philadelphia, Pa.

A three minute job

to lace a 5" belt at a cost for material of **one cent** if you use

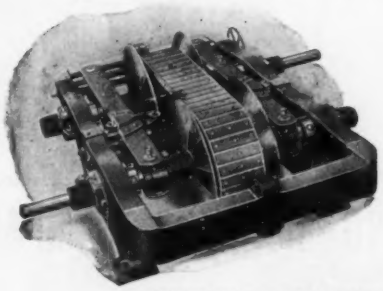
The Jackson Belt Lacer.

The lacing is of coil steel wire, and a 5" connection will sustain 1900 lbs. tensile strain. Other widths in proportion. Joints so compact that they pass over the smallest pulley without pounding, slipping, or strain. A money saver all the time.

Send for Catalogue.

Birdsboro Steel Foundry & Machine Co., **Birdsboro, Pa.**

"The Reeves" Variable Speed Transmission



Used to regulate the speed of textile machinery such as tenter frames, driers, dyeing machines, printing machines, in fact any machine requiring variable speed.

INCREASES THE OUTPUT TO THE MAXIMUM

BETTERS THE QUALITY OF GOODS

REDUCES OPERATING EXPENSES TO THE MINIMUM

What more could you ask?

"The proof of the pudding is the eating thereof." Try it.

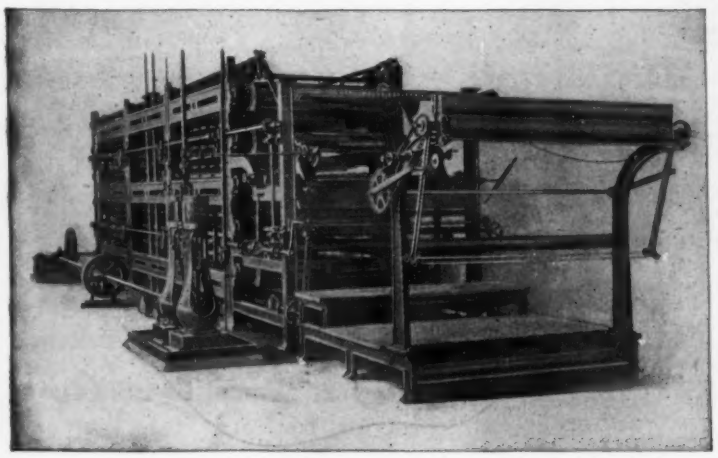
REEVES PULLEY COMPANY
Columbus, Indiana

New England Agents
Cell Drier Machine Company
84 State Street, Boston

New York Representatives
Patterson, Gottfried & Hunter
146-150 Centre Street

TENTERING AND DRYING MACHINES

WITH LOW DOWN FEED. PATENTED FEBRUARY 26, 1895.



Tentering and Drying Machines on Pipe System. Special Dryers for Heavy Felt Goods. Hot Air Drying and Tentering Machines.

Fulling Mills, Washers, Chinchilla and Whitney Machines, Whipping Machines, Cone Willows, Marsden & Blamire Lap Feed, Dyeing Machines for Piece Goods, Soaping Machines, Wringing Machines, Jigs (Double or Single), Dewing Machines, etc. Crabbing Machines for worsted. Made either single, double or triple.

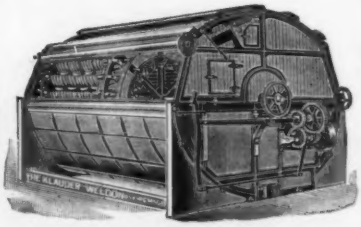
MANUFACTURED BY

D. R. KENYON & SON, Raritan, N. J. Successors to KENYON BROS.

Long Distance Telephone—Somerville 21.

RAW WOOL AND COTTON MACHINE.

MACHINES
sold on
2 MONTHS' TRIAL
YOU
TAKE
NO
RISK

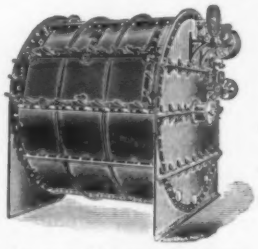


SKEIN AND SLUBBING MACHINE.

THE KLAUDER-WELDON DYEING MACHINE COMPANY

P. O. Box K, AMSTERDAM, N. Y.

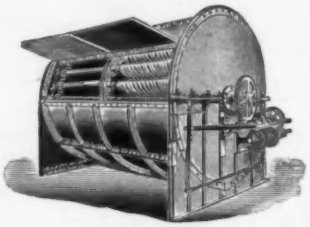
Machines for Dyeing, Bleaching and Scouring Woolen, Worsted, Cotton and Silk Skeins—Slubbing—Raw Cotton and Wool, Waste, Rags, Shoddy, Hosiery, Underwear, Hats, Caps, Knit Cloth, Tapes, etc.



SULPHUR HOSIERY MACHINE.

Special Machines for Sulphur Colors

WILL EARN THEIR COST IN
LABOR ALONE
IN FROM
6 TO 12 MONTHS
ACCORDING TO CAPACITY



SULPHUR SKEIN MACHINE.

Fairbairn Lawson Combe Barbour, Ltd.

LAWSON BRANCH

Hope Foundry. **Leeds, England**

MAKERS OF MACHINERY FOR

Preparing and Spinning

Flax, Hemp, Tow and Jute

Special Machinery

for the Manufacture of

Twines, Rope Yarns and Binder Twine

Good's Combined Hackling and Spreading Machine.

Long Reach Screw-Gill Drawing Frames. Chain-Gill Drawing Frames with Apron Heads.

Patent High-Speed Horizontal and Automatic Spinning Frames for Manila.

Improved Laying Machines.

Haskell-Dawes Tubing Twisters.

Brownell's Patent Twisting and Laying Machines for Twine.

Complete Planes and Estimates for Flax, Tow, Hemp and Jute Mills, Trawl Twine Factories and Steam Ropeworks.

Farrel Foundry & Machine Co.

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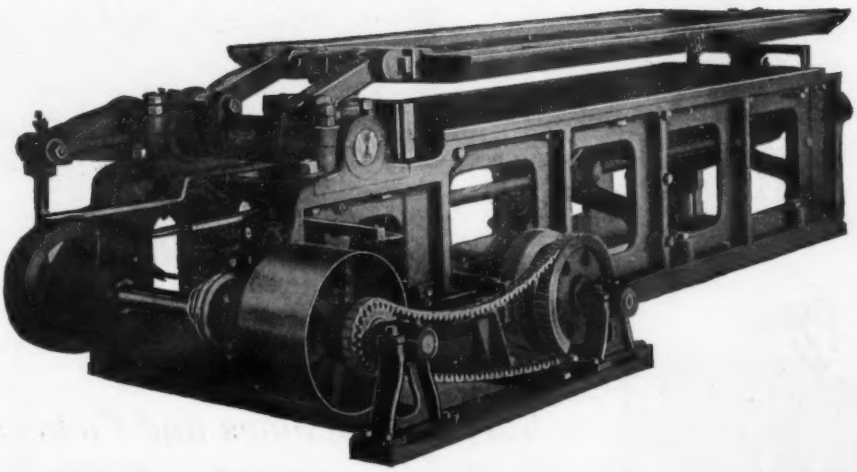


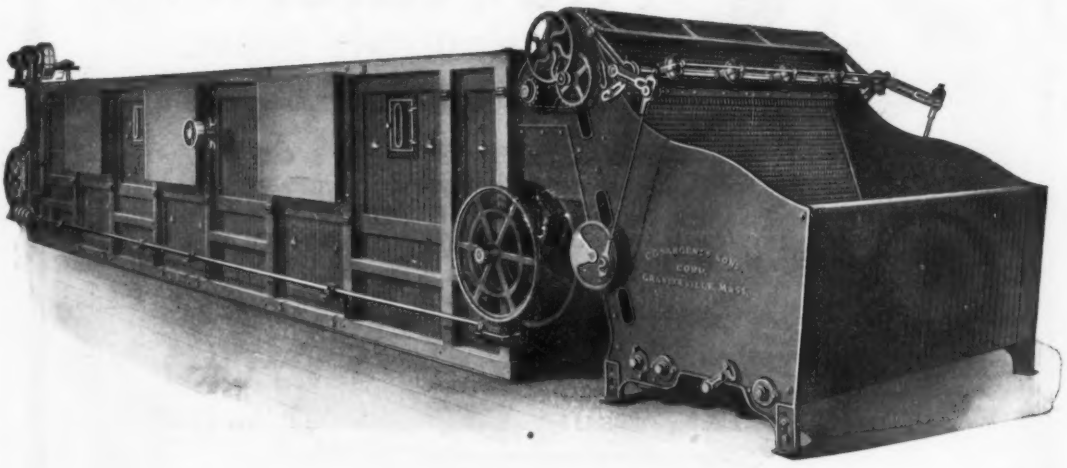
SINGLE AND DOUBLE FELT HARDENERS.

Chilled and Soft Iron Rolls. Heavy Transmission Machinery.
Machine Moulded and Machine Cut Gearing, to 20 ft. diameter, Etc., Etc.
Heavy Castings, in Gray Iron or Semi Steel.

C. G. SARGENT'S SONS

CORPORATION

GRANITEVILLE, MASS.



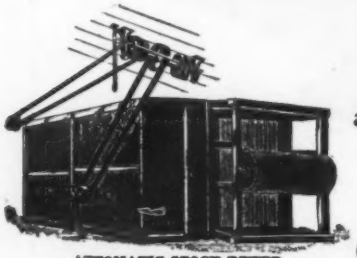
BUILDERS OF

Stock Dryers, Wool Washers, Wool Dusters, Carbonizing Plants, Burr Pickers, Etc.

"20th CENTURY" MACHINERY

Dryers for Wool and Cotton Stock, Yarn, Stockings and Underwear. Carbonizers, Ventilating Fans, Yarn and Wool Scouring Machines, Cloth Washing and Dyeing Machines, Tom Toms, Chroming Oxidizing Machines.

WEB FEED.



AUTOMATIC STOCK DRYER.

We also manufacture Kershaw's Geared Traveler and Improved Web Feed.

Garnett Machines and Pickers.

We Recloth or furnish New Metallic Toothed Cylinders and Feed Rolls.

AMERICAN DRYING MACHINERY CO.,
19th and Westmorland Sts., Philadelphia, Pa.

The American
WROUGHT STEEL
PULLEY

Patented in the United States and Foreign Countries.

SEND FOR BOOKLET.

Is a parting PULLEY and can be applied without stripping the shaft.
It is Light, STRONG, and lasts a lifetime.
It clamps to the shaft perfectly — keys and set-screws superfluous.
Interchangeable metal Bushings to fit shafts of different sizes.
Particularly adapted to TEXTILE manufacturing.

Sold by the Leading Supply Houses all over the WORLD.

The American Pulley Co.,

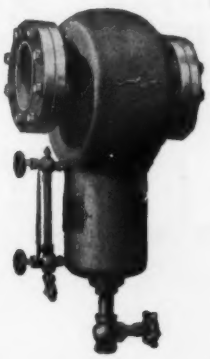
29th and Bristol Streets, : : PHILADELPHIA, PA.

SPINDLES

EASTON AND BURNHAM MACHINE CO.

PAWTUCKET, R. I.

REPAIRS FOR RABBETH SPINDLES



DO YOU USE EXHAUST STEAM FOR HEATING OR DRYING?

Do you know that exhaust steam is just as good as live steam at the same temperature? The only difference is that it sometimes contains cylinder oil, which can be gotten rid of by passing the steam through a **COCHRANE OIL SEPARATOR.** The steam may then be sent through the drying coils or rolls and the condensation (which is pure distilled water) returned to the boilers, via a Cochrane Heater and Receiver.

If you also use hot water, you can just as well heat it by means of exhaust steam as by live steam and you can keep the money in your pocket that you would otherwise spend for coal.

We have put in a large number of plants in textile mills for exhaust steam heating or drying and for supplying hot water for washing, dyeing, bleaching, etc.

If you will kindly send us particulars about your plant, we would be pleased to draw up preliminary plans and estimates. Remember that a Cochrane Feed Water Heater and Receiver takes the place of a closed heater, steam separator, traps, expansion and return tanks, filter, water purifier, and quite a nest of piping.

A Cochrane Heater saves money even before it begins to operate.

Ask for our special pamphlet 13-S.

HARRISON SAFETY BOILER WORKS

3158 N. 17th St., Philadelphia, Pa.

Keeps properly moistened and purified air in constant circulation

THE BELL HUMIDIFYING SYSTEM

Uniformity of product

cannot be attained or maintained without uniform humidity. In a properly moistened atmosphere textile materials are more flexible and coherent, working with a smoothness and uniformity impossible to obtain under ordinary mill conditions.

VENTILATION & HUMIDIFICATION
BELL PURE AIR AND COOLING CO.
TRADE MARK

Healthful Operatives

are a paying investment from the dollar point of view to say nothing of the humanitarian idea that is receiving so much attention just now. Pure air without excessive moisture is a sure means to this desirable end producing both pleasing and profitable results.

Full information on request.

Bell Pure Air & Cooling Co., 97 Cedar St., New York.

Telegraphic Address: "WHITELEY, HUDDERSFIELD." Nat. Telephone, 598 and 599.

Wm. Whiteley & Sons Ltd.

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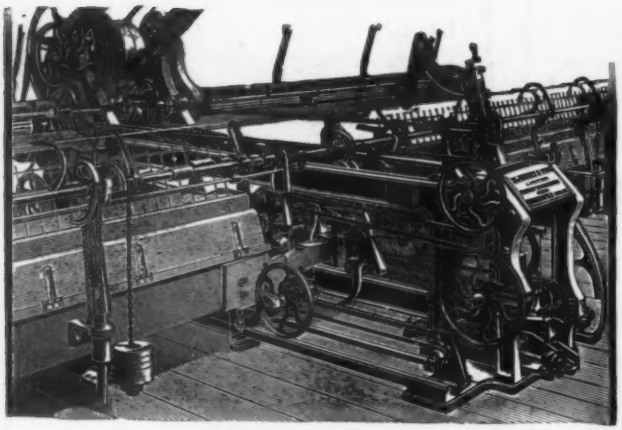


SELF-ACTING MULE.

Makers of all descriptions of Tentering and Drying Machines.

Moore & Whiteley's Patent Wool and Cotton Dryer.

Crabbing or Winding-on Frames.

Cross Raising Machines, Wool Scouring Machines,

Hydro Extractors. Warp Sizing.

Cool Air Drying and Beaming Machines.

Warping Mills with Patent Sectional Dividing Apparatus.

Self-Acting Mules. Bobbin or Pirn Winder, &c., &c.

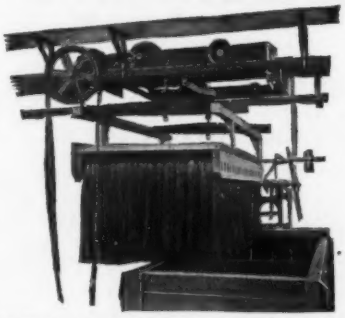
Mercerizing Machinery.

Second-hand Tentering Machines in good repair at low prices.

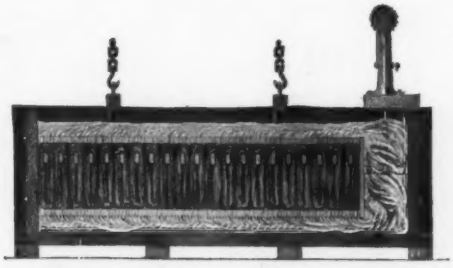
The Hussong Dyeing Machine

Patented Nov. 6, 1900. April 9, 1901. Nov. 29, 1904. June 5, 1906.

THE ONLY MACHINE THAT WILL DYE SULPHUR BLACK SUCCESSFULLY.



This illustration shows our Compressed Air Hoisting Carriage, with 300-pound Yarn Machine Suspended.



Longitudinal Sectional View, showing the circulation of dye liquor through the yarn when in operation.

Points of Superiority Which We Claim for the Hussong Machine.

Durability, Even Dyeing, Saving of Steam, Saving of Dyestuff, Saving of 75% in Labor, Makes No Waste Whatever, Requires but Little Power to Operate, No Friction on the Material, Leaves the Yarn and Slubbing in its Natural Condition.

Built by the **American Dyeing Machine Co., Office 609 Pearl St., Camden, N. J.**

BEWARE OF INFRINGEMENTS.

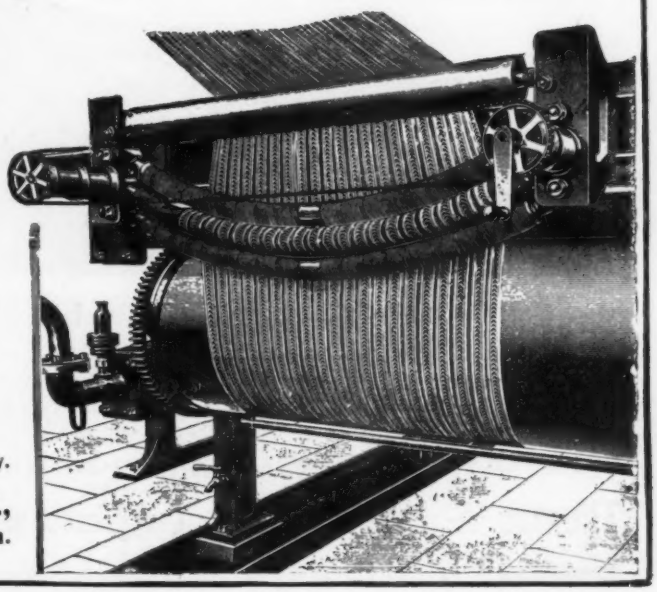
Perfectly Even Tension Both Ways

THIS ideal cloth expander gets the full width of the goods in a most satisfactory way. Can be attached to calenders or cans. Hundreds in use in Great Britain and on the Continent—hundreds more in the United States, with constant satisfaction.

Manufacturers unsolicited say to us, "You have the greatest thing in a spreader ever brought to our attention."

We put them in on trial.
Test it on your own work—'t will pay.

Thomas Leyland & Co.,
60 India St., - - - Boston.



Reinforced Concrete Mill Buildings

We are prepared to furnish plans, specifications reinforcement details and supervise the construction of textile mills and industrial plants in general. Mill buildings built of this material are cheaper than the regular mill constructed buildings. We have several now under construction.

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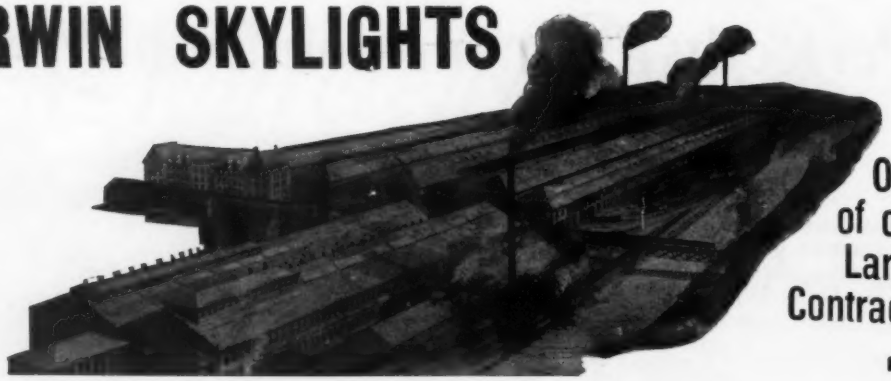
Mill Architect & Engineer
179 Summer Street, - Boston, Mass.
Henry Suck, Jr., Arch't. Send for Bulletins. Adolph Suck, M. E.

IRWIN SKYLIGHTS



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Strong—Light—Durable—Flexible

They admit daylight without leaking and are absolutely watertight. They provide for the unequal expansion and contraction of the metal frames and glass, so that the danger of the glass breaking is eliminated. Condensation gutters carry away all moisture by the proper channels. Large contracts are our specialty.

Write for Catalogue "Skylights."

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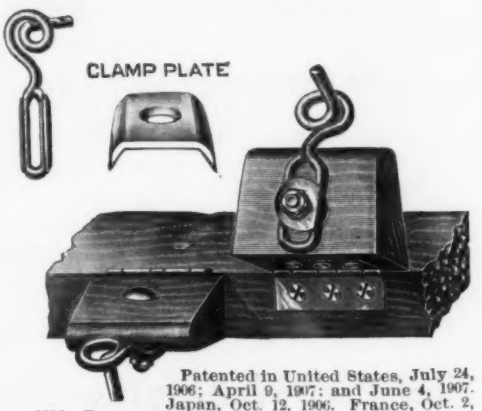
Palmer's Improved Adjustable Thread Guide

This guide supplies an accurate, rigid and permanent adjustment, and is attached to the ordinary spinning frame clapper. It has more merits than any other adjustable guide and at a greatly reduced cost. Perfect adjustment saves broken ends, abnormal wear of the rings, and increases the production and quality. Will soon pay for itself. *Send for free sample and circular.*



Patented in United States, July 24, 1906; April 9, 1907; and June 4, 1907. Japan, Oct. 12, 1906. France, Oct. 2, 1906. England, Sept. 13, 1906. Spain, July 23, 1906. Belgium, July 24, 1906 and Italy.
Patents applied for in the United States, Germany, Switzerland, Austria, Russia, Poland and India.

Patented and Manufactured by

The I. E. Palmer Co.

Middletown, Conn , U. S. A.

Cloth Washers, Dye Tubs, Vats, Fulling Mills,
Piece Dyeing Machines, Special Machinery,
Brass Founders, Tanks, To Order.

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Spindles and Flyers, for Cotton, Wool, Silk, Flax, etc.

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MECCA BRAND

for Textile Mills

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We wouldn't be so cock sure of saving you money if we weren't doing it every day for many other Textile Mills. Our proposition is based firmly on results, not on prophecies.

Write us for Prices and Samples.

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Paper. Twine. Tissues. Press Boards.

Operating Expenses Unnecessary

Spinning Frame Casting made in Great Britain and badly broken in transit. Was completely restored by Ferrofix Process in a few hours and at nominal expense.

To the manager of a Textile Mill this sounds odd, but there are certain expenses which really are ***unnecessary*** and if they are eliminated (and that is what every "live" manager is striving for today), the "Profit and Loss" statement at the end of the year will make a far better showing.

This is the way:

When a piece of machinery breaks, do not throw it away, and pay a good, big price for a new one, and perhaps wait for days or weeks for it (with possibly one or a hundred machines lying idle during that time). Do not patch it, for patches are only temporary relief, and often do more damage. Whether it is large or small, RESTORE it, in a few minutes, or at most, a few hours, and at an actually nominal cost—RESTORE it, LITERALLY, to full working strength—AS GOOD AS NEW.

The Ferrofix Process is tried and proven for this very thing. It is now a part of the equipment of a large number of the up-to-date mills throughout the Eastern, Middle and Southern States.

A postal-card will get you complete information, or call at the Ferrofix Works in Atlanta during the Cotton Convention.

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WORKS:
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Manufacturers should look up the advantages of the

Metallic Drawing Roll

Over the leather system before placing orders for new machinery, or if contemplating an increase in production, have them applied to their old machinery

33 Per Cent. More Production GUARANTEED.

SAVES

Roll Covering, Varnishing — *Floor Space, Power,* — *Waste and Wear.*

ONE-THIRD LESS WEIGHT REQUIRED.

Write for Points Claimed, also Prices and Particulars to

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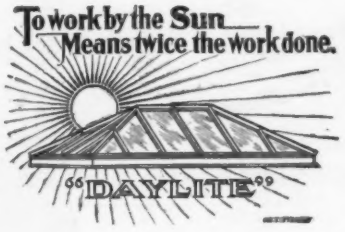
The Right Light



For Textile Mills

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VAN NOORDEN SKYLIGHTS

OUR CATALOGUE C CONTAINS
MUCH SKYLIGHT INFORMATION

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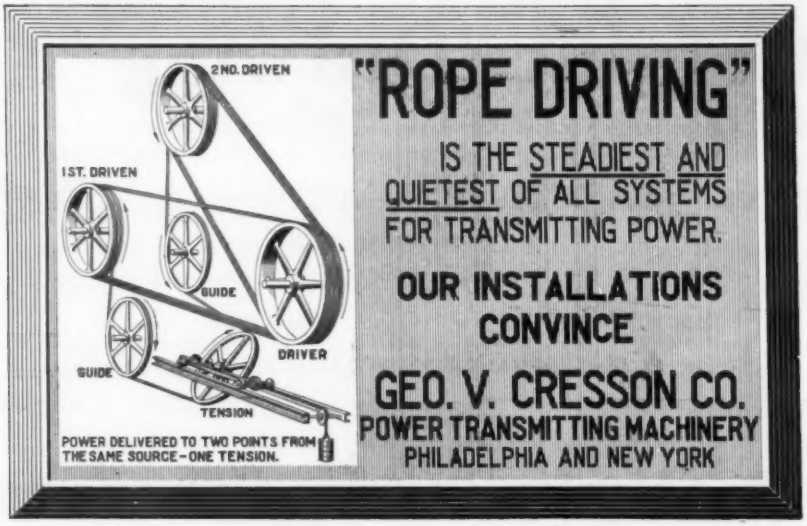
BOSTON, MASS., U. S. A.

BULLETIN ON ESSENTIALS OF ROPE DRIVING



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Shultz Sable Rawhide Belting

is surface tanned by a special patented process.

Belts tanned on the surface only have a smooth soft finish which clings to the pulleys, while the interior retains the life and strength of the rawhide. The fibres are long and tenacious, not broken-up and stiff.

There are plenty of reasons why Sable is more efficient in transmitting power and wears longer than any other belting. We use only the best and heaviest hides carefully prepared by up-to-date methods. Our belting is thoroughly stretched before leaving the factory, and trimmed to run true.

Shultz Belts can be had for 90 days free trial. Send for Catalogue "6."

SHULTZ BELTING CO., St. Louis, Mo.

Makers of "Sable" Rawhide and "Aqua" Belting, also Belt Dressing, Cement and Lacings.

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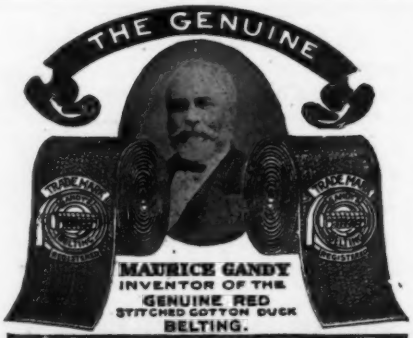

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PATENTED 1877

Some parts of a textile establishment are hot and damp.

Leather belts can't stand it, and soon rot out.

Try a **GANDY** and notice the difference in length of service and tractive power. No more leather belts, after a **GANDY** has had a chance to show what it can do.

Be sure to get the genuine—it has the stencilled words "Genuine Gandy Belting" at every tenth foot.

THE GANDY BELTING CO.

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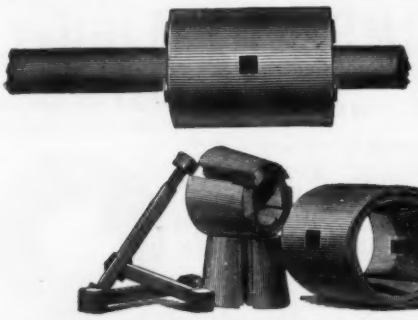

THE "SELLERS" MAKE OF

DOUBLE CONE VISE COUPLING

has a way of holding shafts together, that no other COUPLING can equal.

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Makers of

SHAFTS,
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and all most approved appliances for the

Transmission of Power.

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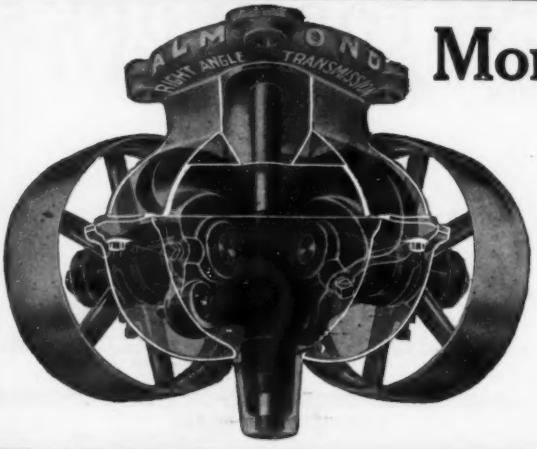
MACHINE TOOLS.
INJECTORS. POWER CRANES.



More Floor Space

You can turn idle floor space into productive floor space by properly arranging machines with the aid of an

Almond Right Angle Transmission

A clean and noiseless right angle drive. Does away with objectionable mule pulley stands and noisy bevel gears. Will send catalog on request.

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"Their Tremendous Durability"

That's why the largest mills are using

Morris Duck Baskets

(Not how cheap but how good)

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"The feature that appeals to us most about the duck baskets purchased from you is **their tremendous durability**. While the first cost greatly exceeds that of baskets of other material, we find that in the long run it pays us to use them."

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Absolutely secure combination of Shield and Bobbin guaranteed.

Loose Shields Impossible.

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Specialties: PATENT "LOCKFAST" and "CLIMAX" Shields. ENAMELLED CONDITIONING BOBBINS, Impervious to Steam, Moisture or Oil.

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ELEVATORS

ESPECIALLY ADAPTED FOR MILL USE.

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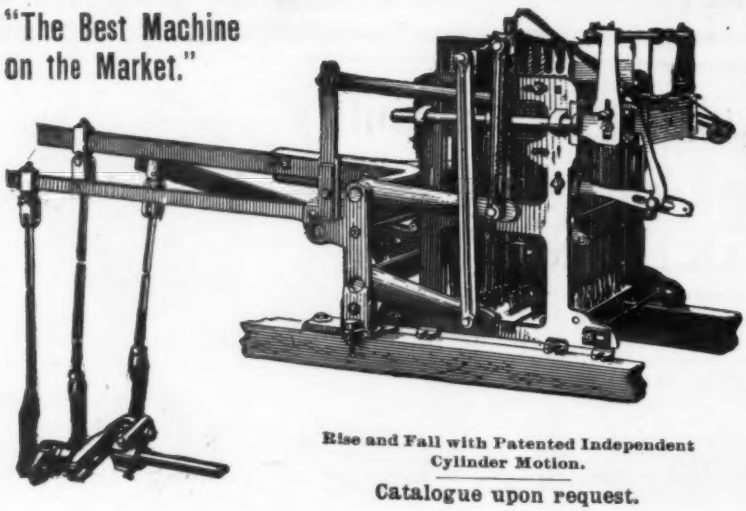

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Original Fine Index Machines

Single Lift, Double Lift, Double Cylinder, Rise and Fall, Crossborder,

THOMAS HALTON'S SONS,

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79 Milk Street, Boston, Mass.

Received the HIGHEST AWARD on recommendation of the FRANKLIN INSTITUTE for

"Simplicity and Originality of Design."

Is the largest manufacturer of HUMIDIFIERS in the World. The last twenty year receiving the HIGHEST AWARD in this country and Europe for its AIR-MOISTENING SYSTEM. EIGHT GOLD MEDLALS and others.

The Only Perfect System of Air Moistening

And Has Been Adopted by the Representative Manufacturers of this Country.

The only System adopted in the Textile Schools. Write for Booklet "T" on Humidification. Legal Proceedings will at once be taken against infringers and users of infringements.

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Mill Sewing Machines

No. 9.—Portable Foot-Power Rotary Sewing Machine

It is especially adapted for use in Cotton and Woolen Mills, Bleacheries, Print Works at the Printing Machines, in Dye Works, Cloth Rooms, at the Fulling Mill, Shears, Calendars, Gigs, Drying Machines, etc., or any of the different finishing processes in textile mills.

Manufactured by the

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Use Yale & Towne Electric Hoists

The portable electric hoist affords the economies of power equipment with only light cost for installation. It is an economical device, even where substituted for the cheapest of labor, and for either constant or occasional use. The capital invested is moderate, the operating cost low, and it adapts itself to every condition of service.

Especially available in the textile mill for power plant, warehouse and machine shop use.

1 to 30 tons *Write to us*

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IMPORTANT TO PACKING USERS

We kept out of the Metallic Packing field until we might offer a product that we could honestly sell and guarantee as the best of its kind. We have it in the MORRIS METALLIC PACKING. It is made of the finest cast-iron, that wears more smoothly and is less affected by excessive heat than any other packing.

MORRIS METALLIC PACKING

reduces friction to a point so far below any other packing that it soon earns its cost in power saved. Its mechanical construction guarantees its efficiency, without the wearing strains that soon break down other packings or score the rods.
The Morris Valve Stem Packing is the only metallic packing that always rotates with the stem and cannot cut the rod. Sold on thirty days trial.

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Hydro-Extractors, Exhaust Fans, Dye Tanks and Tubs.

Adjusts itself to an uneven load, runs without vibration. Unusual capacity for high-class work.

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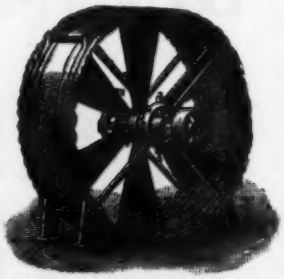

Moves more air than any other fan made. Very efficient under widely varying conditions. Noiseless and does not obstruct the light.

FIG. 22.

Round Basket with renewable hard wood Shoes.

The Lane Patent Steel Frame Canvas Mill Basket.

Perfectly adapted materials and a practical common sense way of putting them together, are features which make the Lane Basket so pre-eminently superior to others, for the various uses of a textile mill.

It is the original Canvas Basket and embodies desirable features which are patented and will not be found in any other basket.

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SOLD BY PRINCIPAL SUPPLY HOUSES

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Oil Separator

MOTOR WOUND FOR ANY VOLTAGE.

Separates oil from bolts, nuts, and scraps of all kind—oil that would otherwise be wasted, and makes it as good as it ever was, for further use. **Send for Catalogue.**

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109 Beach Street, Boston, Mass.

Incorporated 1864. **Founded 1845.**

The Lighting of the Building

is the most important problem of its construction. By using the saw tooth construction of roof with the "*Anti Pluvius*" system of skylight the maximum amount of light is carried into the building to every part of the floor. The ventilation is another important consideration and every mill should be equipped with the *Lovell Window Operating Device* by means of which a long line of sash can be opened and closed from one station. Let us submit estimates for the lighting and ventilation of your building. We will guarantee satisfaction.

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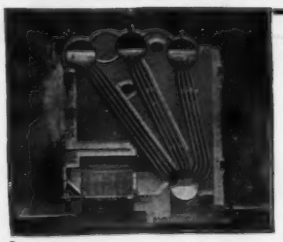

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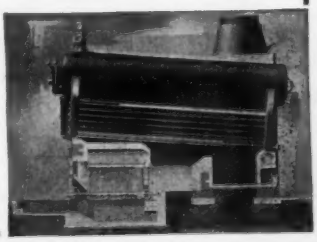
Burns Slack with Great Economy

The Murphy can be installed under any type of fire-tube or water-tube boiler and to units of any size.



SETTING UNDER TWO TYPES OF BOILERS SHOWN HEREWITH

MURPHY IRON WORKS

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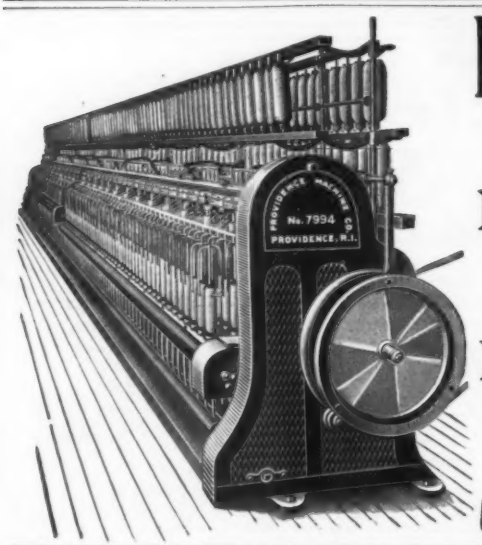

Providence Machine Co.

Manufacturers of

Improved Cotton Roving Frames

Improved Worsted Roving Frames

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Established 1841.

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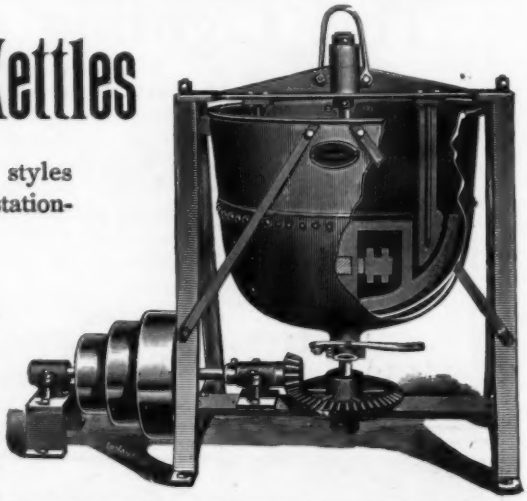
This cut represents one of our many styles of steam mixing kettles, made with stationary and removable stirrers.



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Badger Fire Extinguisher.

Crabbing, Steam Finishing, Opening and Folding, Tacking, Sewing, Squeezing Machines

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ALBERT BIRCH, TEXTILE MECHANICIAN

Bleaching and Napping Machinery

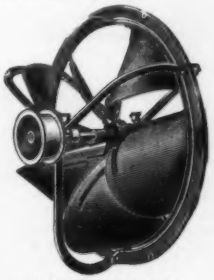
Ideal for drying

When you want a high quality, output—increasing way of drying textiles—get

A Berry Wheel

'Tis a most efficient and economical moisture eliminator. *Get one going in your mill.*

This is our Berry Wheel, the most effective agent for moving air, eliminating steam and other impurities in the atmosphere.



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For QUALITY OF FINISH
For QUANTITY of PRODUCTION
HAS STOOD THE TEST OF YEARS

Sole Agents for U. S. A.

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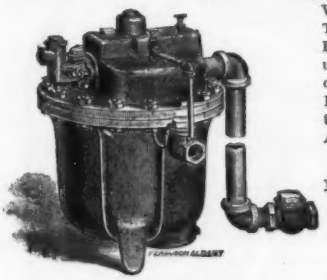
NEW FEATURES: Wearing Parts, Valve and Seat Renewable.



We manufacture Steam Traps for all duties, High and Low Pressures, returning the Condensation back into Boiler or Discharging to Hot Well, Tank, or Atmosphere.

No Elastic Gaskets, all Joints Ground Metal and Metal.

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ALBANY STEAM TRAP CO.
ALBANY, N.Y.
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Eureka Fire Hose

THE BEST FIRE HOSE MADE.

(Trade Mark.)

For use in

Cotton Mills, Woolen Mills and Factories.

Seamless Woven and Rubber lined EUREKA COTTON HOSE, has no equal. Send for circular and testimonials.

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OF EVERY DESCRIPTION FOR COTTON, WOOLEN AND WORSTED.

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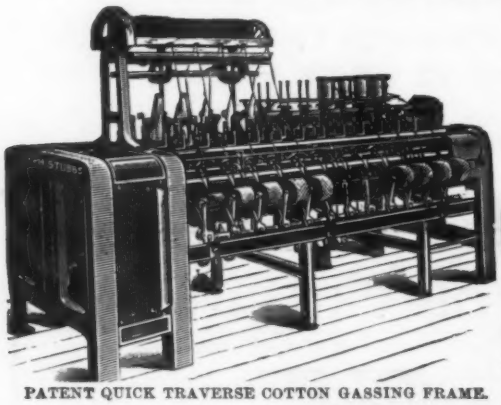

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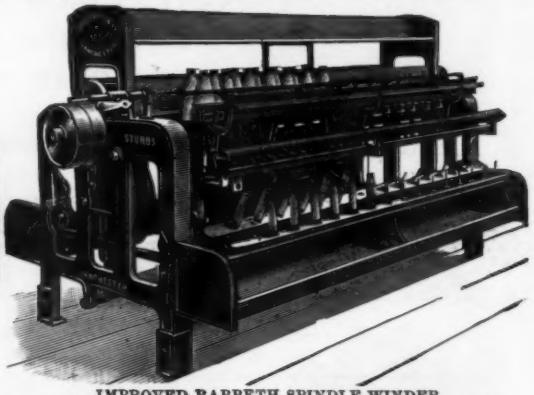

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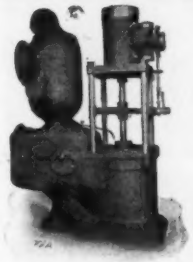

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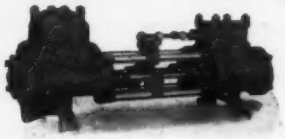

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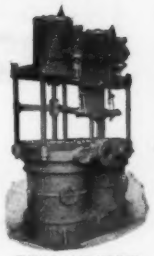

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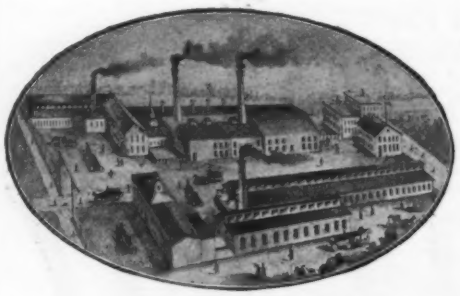

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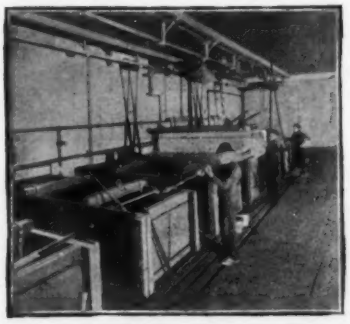

Being successfully operated by some of the largest manufacturers in the country.
The saving of labor will more than pay for a machine in a few months.
Capacity; 2,000 lbs. a day per man.
Machine can be seen in operation at any time at my plant where I have 13 in operation all the time.

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Creosoted Flooring never rots

Floor planks treated by our process are laid just like an ordinary floor and are so long lived that they are ideal for Dye Houses, Wet Finishing Rooms or wherever processes keep the floors wet. Creosoted Flooring retains all of its original strength, never rots under any conditions and does away with the expense and annoyance of frequent renewals. It's a saving and satisfactory solution of the floor problem. Tell us the style, width and thickness of your flooring, the quantity required, and we will tell you what it will cost.

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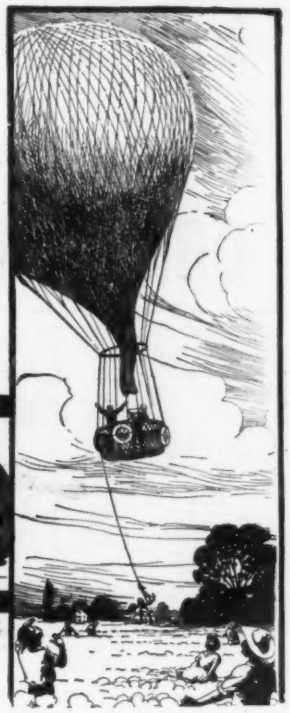
With the present high prices of rope Trojan Band and Buckle is a money saver.



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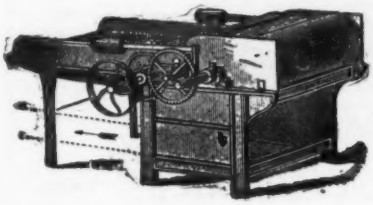

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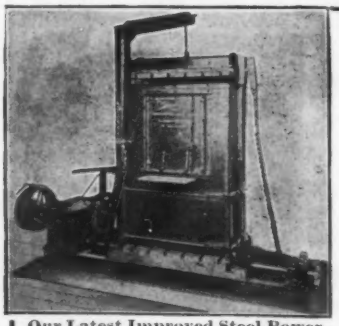

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If a belt runs slack without slipping—If the stretch is slight and that uniform—If it is less affected than any other belt by water, steam, fumes or gases—If it has a longer, serviceable life,—Is it the best belt?

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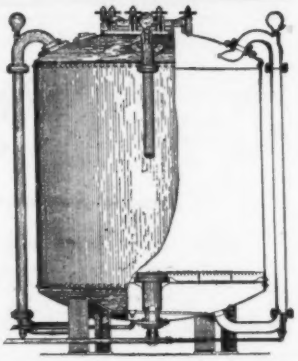

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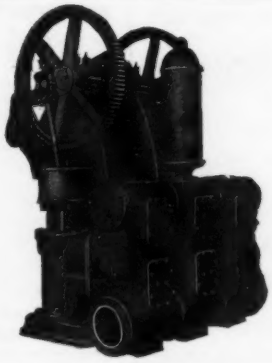

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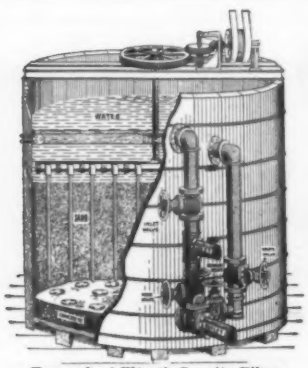

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There is only one Filter, the

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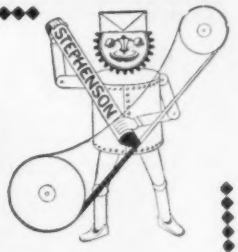

You will notice, wears the smile that won't come off Because he's happy—happy in showing you what Belt Dressing to use and how to use it.

This TRADE MARK is valuable—to you because it protects you against substitutes and counterfeits—to its owners because it never appears accept on the Genuine STEPHENSON Bar Belt Dressing, which has an established enviable reputation in the principal markets of the world.

Why this is true can be proved to your satisfaction if you will write us for a free sample and test it on the worst acting belt under your charge.

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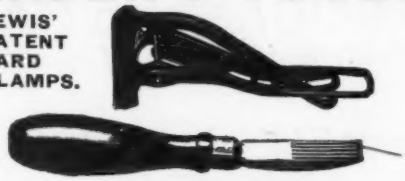
LEWIS' PATENT CARD CLAMPS.



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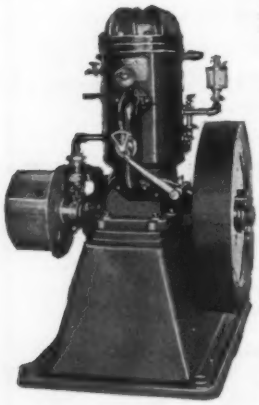

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1866 1907

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40th Annual Statement

January 1, 1907.

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Surplus,	1,485,457.73
Reserves,	1,931,847.29
Assets,	3,978,245 71

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prevents broken ends

in roving by its smooth, glossy inside finish and true running on the card table. The body is made of the best chemically treated fiber which has many of the qualities of rawhide. All rivets are burred so they cannot draw out. Rings are made of steel and have rounded edges. Every can is accurate in size and perfectly round. They are built for long continued satisfactory service. Write for prices and list of users.

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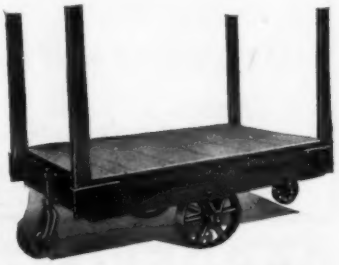

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1" to 2"

E. K. Dies work easy because they are hollow ground to correct angle and tool out the metal. No change of dies in threading from 1" to 2" pipe.

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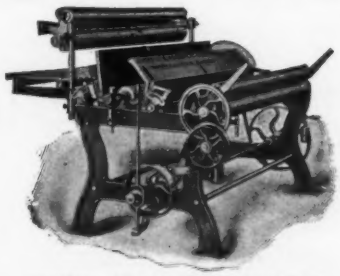

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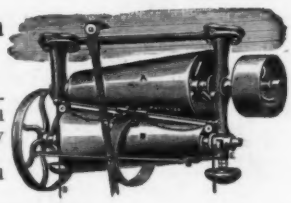
Variable Speed Countershafts

The Evans Friction Cone Pulleys



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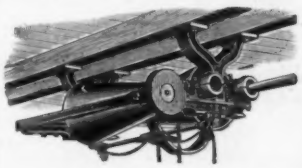

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THE BAMFORD DUST PROOF and SELF-LUBRICATING SPINDLE TUBE

saves oil, prevents clogging with dust and lint, thereby insuring longer life to the tubes, saves labor, maintains uniform speed, **and most important of all**, makes PERFECT YARN. Refer to largest worsted mills.

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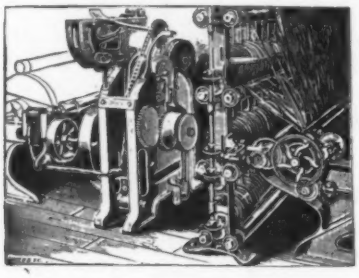

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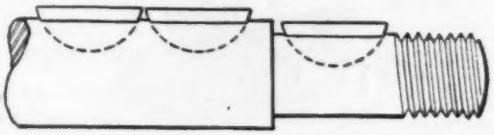

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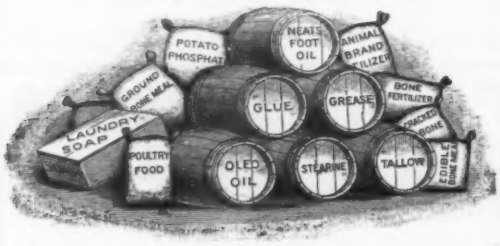

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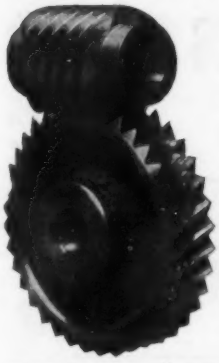

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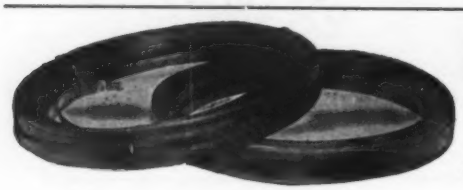

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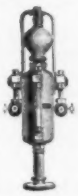

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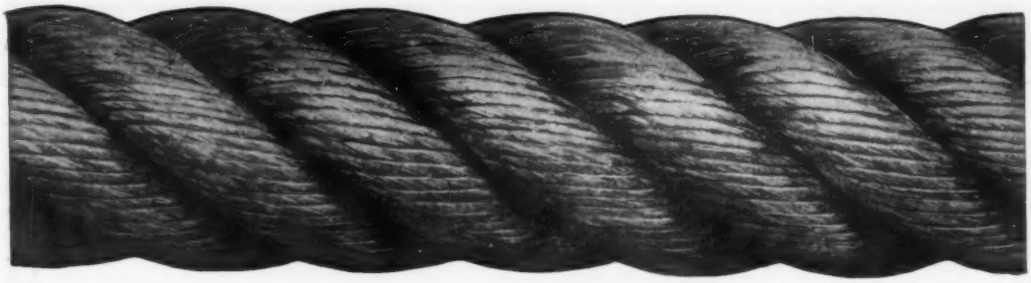

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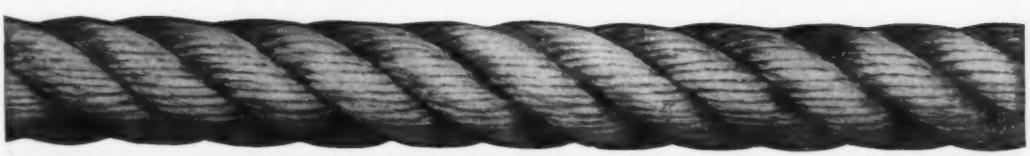

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PART II. Is the Yarn Trade Index, containing classified lists of yarn spinners, arranged according to kind of yarn, size and number spun, etc. All the mills with worsted machinery are included in this section.

PART III. Contains Classified List of mills doing order and commission work, also dyeing, finishing, bleaching and printing establishments, classified according to the kind of work done, and so far as possible giving width of goods handled; also shoddy extract and flock manufacturers and wool scouring establishments.

PART IV. Manufacturer's Selling Agents and Dry Goods Commission Merchants, giving the name and address of concern, character of goods handled, different departments, with managers, list of manufacturing clothiers, and suit and cloak manufacturers, giving specialties and buyers' names. A list of city offices of textile mills is given.

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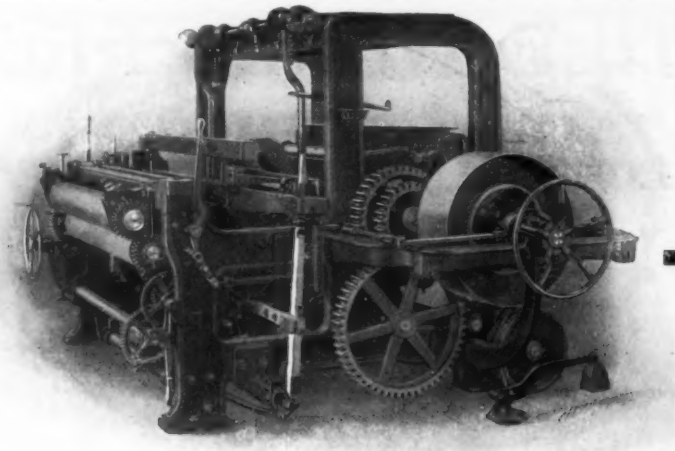

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Table of Contents for October.

PAGE

Monthly Comment 75
The Price of Sewing Thread 82
The International Cotton Conference at Atlanta 89
The New York Cotton Exchange Banquet 102
Textile Exhibitors Association 104
Washington Meeting of the National Association of Cotton Manufacturers . 105

CORRESPONDENCE AND NOTES.

The Lawrence Loom Fixers' School 141
A Combing Machine. 142
A Woolen Card. 143
Silk Lustre on Cotton Cloth 144
English Notes 147
Adulteration of Starches Used in Textile Mills 150
Back Starching Linen Drills 154
Electrolytic Treatment of Fibers 155
Plan of a Woolen Mill. 156

QUESTIONS AND ANSWERS 158

KNITTING DEPARTMENT.

Knit Goods Situation—The Manufacture of Braid in the United States—An Order and Cost System for a Knitting Mill—Price of Knit Underwear—Knitting Mill News 162

NEW MACHINERY AND PROCESSES 174

DYEING, BLEACHING, PRINTING, ETC.

Benzine and the Cleansing of Fabrics—Dyeing in Copper Vessels—Chemical Tests in the Bleaching Process—Bast Soap and Bast Soap Substitutes in Silk Dyeing—Dyeing Woven Felts- Dye Recipes . 184

MILL NEWS 194
PERSONALS. 201
NEW PUBLICATIONS 206
BUSINESS LITERATURE 206
INDUSTRIAL NOTES 207
RECENT TEXTILE PATENTS. 210
TEXTILE TRADE-MARKS REGISTERED 212
WOOL MARKET 239
COTTON MARKET 241
YARN MARKET 243
RAG AND SHODDY MARKET 253
DYES AND CHEMICALS 254

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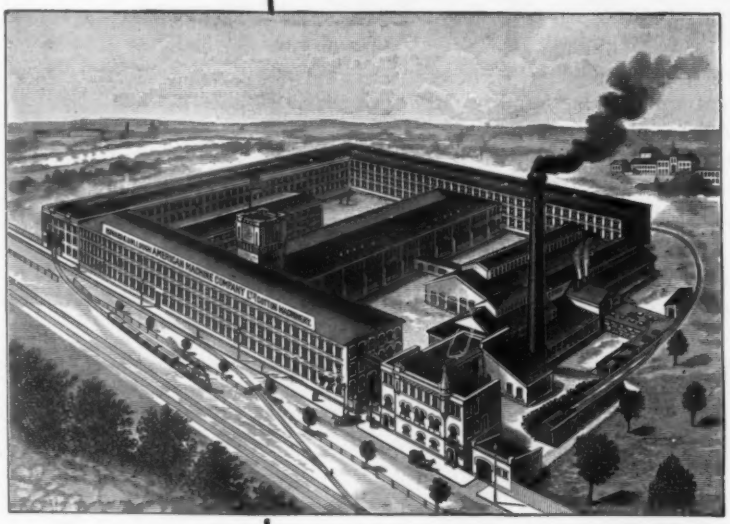

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VOL. 33 (NEW SERIES.) October, 1907 No. 1

Monthly Comment.

Moisture in Worsted Yarn.

"The cellar where I store my yarn as it comes from the spinning and twisting rooms is the best paying department in my mill." Thus spoke a leading worsted yarn spinner some years ago, referring to the increase in the weight of worsted yarn while stored in a cool, damp cellar under his mill before being weighed, invoiced and shipped to weaving and knitting mills. This increase in weight is due to the high power of wool to absorb and retain moisture without feeling damp. In a warm, dry atmosphere wool may contain only 5 per cent. of moisture, based on the dry weight; in a cool, damp air the same wool may hold water equal to 35 per cent. of its total dry weight.

One hundred and five pounds of wool (100 pounds dry wool and 5 pounds of water), under the former conditions would become 135 pounds (100 pounds of dry wool and 35 pounds of water) under the latter conditions. There would, of course, be the same amount of wool in both cases, the increase being due to the addition of 30 pounds of water. A test was made at Lawrence, Mass., some years ago by Wm. D. Hartshorne, now president of the National Association of Cotton Manufacturers, to determine the variation in the weight of a skein of worsted yarn exposed to normal, atmospheric conditions. The report of this test contained the following statement:

> "The great variations in the weight of this skein of yarn were remarkable. The moisture it contained ranged from a little over 7 per cent. to as high as 35 per cent., often with a variation of from 15 to 20 per cent. in twenty-four hours."

The results of this test are not to be accepted as conclusive regarding the extremes of humidity in worsted yarn in this country or even at Lawrence, Mass., where the test was made, but are cited here solely as an illustration of the high moisture-absorbing power of wool and the extreme variations in the quantity absorbed under varying atmospheric conditions. These variations show what great possibilities for gain or loss are possessed by worsted yarn spinners in regulating the condition of the yarn sold to their customers. It is impossible, of course, for yarn to be invoiced in large quantities with either the maximum or minimum amount of moisture in it, but let us suppose that under normal conditions worsted yarn selling at 80 cents a pound contains 10 per cent. of water, and that this is raised to 25 per cent. by storage in a damp place. (To avoid confusion we will base the percentage of moisture on the dry weight.) If sold as it came from the

twisters 11,000 pounds of this yarn would consist of:

10,000 lbs. dry wool
1,000 lbs. water

11,000 lbs. 80c. $8,800

If the moisture was increased to 25 per cent. this lot of yarn would become:

10,000 lbs. dry wool
2,500 lbs. water

12,500 lbs. 80c. $10,000

Thus a gain of $1,200 in the invoice value of the lot would be obtained simply by storage without increasing the value of the yarn to the buyer in the slightest degree. From this it will be plain why the Woolen and Worsted Manufacturers' Association is making an effort to establish a standard of moisture for worsted yarn. There is no doubt that the lack of such a standard is a cause of heavy losses to yarn buyers. In seeking a remedy they have very properly begun by asking the spinners for a conference on the question. If, however, such a conference fails to bring about an agreement, the buyers have a means at their disposal which cannot fail to reduce the losses resulting from paying for water at the price of worsted yarn. That remedy consists in establishing at every mill buying yarn a system of testing every lot purchased to determine the amount of water it contains. It is not necessary to install an expensive apparatus for this purpose. The approximate condition of yarn as regards moisture can be determined by weighing samples as received and immediately after drying at a certain temperature, and without any attempt to determine the absolutely dry weight of the material. If greater accuracy is desired a conditioning apparatus can be obtained at moderate cost, by which the dry weight of the material can be ascertained. Such an apparatus, made in Germany to meet the requirements of individual mills located far from the official conditioning houses, was recently described in this journal. If tests by experts independent of either buyer or seller are required, the conditioning house at New York, which for nearly thirty years has made a regular business of conditioning silk, is ready with complete facilities for doing the same service for the worsted trade.

The worsted yarn buyers and spinners may easily fail to bring about a reform of existing conditions, but if the weavers and knitters awaken to the importance of the question and each one begins to test every lot of yarn purchased the knowledge of their losses from paying worsted prices for water will create a sentiment that spinners will be unable to resist. The probable result would be that a few far-sighted spinners would soon agree to sell worsted yarn with a guarantee as to the amount of moisture, setting an example that other spinners would have to follow.

Whatever may be the outcome of the agitation we hope the mistake will not be made of adopting an American standard of regain for worsted yarn, different from the European standard, which is 18 1/4 per cent. The particular standard is immaterial, for prices will be regulated to conform to it. The important thing is to agree upon a standard, and it is highly desirable that the same standard shall be used in all countries. At present we (Americans) have no standard established for conditioning worsted. The Hartshorne tests, already mentioned, showed an average regain of 17 1/2 per cent., which is practically the same as the European standard of 18 1/4 per cent. More extended tests, to include different localities, may show an even closer agreement between Europe and America. There being no good reason for establishing a different standard the European standard should by all means be adopted in the United States in order to secure international uniformity of weights and prices.

A Combination of Cotton Mills.

The cotton mills of Lodz, Russia, have recently suffered such heavy losses by strikes and riots among their operatives that it has been found necessary to merge six of the largest firms into one corporation. The capital of the new company is fixed at $15,000,000, which is said to be about one-third of the amount represented by the six companies before the shrinkage.

Local Textile Schools.

On another page of this issue will be found a letter from Wm. H. Dooley, instructor in the Lawrence High School, in which he gives an account of the origin and development of a school that has been conducted by the loom-fixers of that city for the last ten years, and suggests that it be made the basis for a textile school of broader scope, both as regards courses of instruction and requirements for admission. At present there is a need of some system by which class instruction will be placed within reach of the large number of mill operatives who are unable to attend a school located at a distance from their homes. This need is admitted by many of the managers and instructors in the regular textile schools, and the suggestion has come from them that a system be adopted by which the central schools now established would send their instructors throughout the state to give instruction in the various mill districts. Even in a town situated so near Lowell as Lawrence, there are many mill operatives anxious to obtain instruction in textile manufacturing, but unable to do so because of the time required to travel to and from the Lowell school.

For a long time Mr. Dooley has been impressed with the urgency of this want of instruction, and has been endeavoring to find some means of providing for it. After considering various plans he has conceived the very sensible idea of utilizing the Lawrence loom-fixers' school as a nucleus. In this way he hopes to give the mill workers of Lawrence a school where they can get instruction in the various branches of textile manufacturing without leaving their own city. His plan in no way conflicts with existing textile schools, but is intended to harmonize with them. To make the plan successful it is necessary to have the co-operation of the local manufacturers and operatives. He informs us that his investigations thus far, which have been on a somewhat extended scale, lead him to believe that both employers and employes would extend encouragement to the proposed development of the Lawrence school.

Artificial Dyestuffs.

Three of the large German color manufacturing companies, Farbenfabriken, Badische Anilin and Soda Fabrik and the Aktien-Gesellschaft fuer Anilinfabrikation of Treptow are about to purchase extensive coal mines at Recklinghausen, Germany, in order to make themselves independent of the German coal trust. The purchase price is said to be 17,500,000 marks ($4,200,000). The three companies are jointly interested in the Norwegian Nitrate Co., which, with the purchase of the coal mines, has made necessary an increase of 34,500,000 marks ($8,280,000) in the capital stock of the color companies. It is stated that by this purchase the color companies become the only industrial concern in Germany independent of the coal trust by owning its own mines.

Testing Starch.

The North Carolina Department of Agriculture deserves credit for the investigation of the adulteration of starches used in the mills of that State. The inquiry is noteworthy because of the tendency of government departments of this character to fall into a rut and neglect the many opportunities for rendering service of great value to the people by really practical investigations. In another part of this issue we give an abstract of the North Carolina report, omitting the names of the selling firms and mills involved. This we do because convinced that the variation between the labels and the starches may be due in large measure to carelessness rather than a deliberate intent to defraud.

If manufacturers were more careful about testing the supplies received at the mill both seller and buyer would realize the importance of maintaining the standard of quality. The North Carolina Department of Agriculture has set an example that might be followed with advantage not only by similar departments in other States and at Washington, but also by individual manufacturers.

In 1905 over 22,000 pounds of silkworm eggs were exported from Turkey.

A Mysterious Mission.

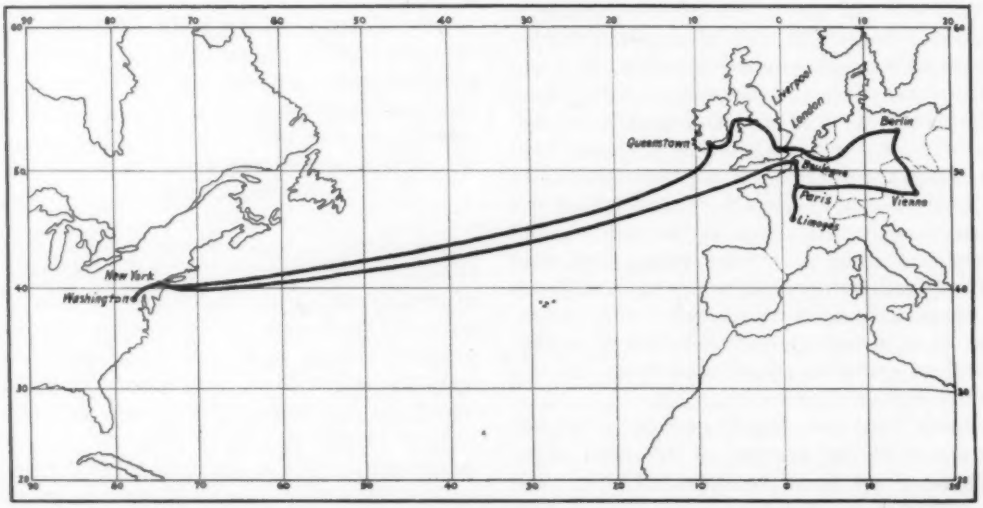
On Sept. 17 there sailed from New York on the Kronprinzessin Cecilie of the North German Lloyd line a special commission from the United States Treasury Department, consisting of James B. Reynolds, assistant secretary of the treasury; Marion DeVries, president of the board of general appraisers; and Byron S. Waite, another member of the board of appraisers. The ladies accompanying them brought the number of the party up to six. It was announced that the commission had been sent by the Treasury Department on a tour of Europe to make "a thorough investigation of export prices and foreign market values. Officials of foreign governments, foreign chambers of commerce and other commercial bodies are to be conferred with; trade organizations on the other side will receive an opportunity to make complaints against the method of administering the American customs laws. Anybody who can throw light upon the question of the tariff relations between Europe and the United States will be welcomed by the commission."

The party charged with this work is to be back at Washington the first week in November, after an absence of 53 days, 16 of which will have been spent on the water and 37 on land, the distance traveled being 6,100 miles by sea and 2,195 miles by land, a total of 8,295 miles at the average rate of 156 miles a day. The itinerary includes stops as follows:

Reach Paris Sept. 24.
Side trip to Limoges.
Reach Vienna Oct. 9.
Reach Berlin Oct. 15.
Reach London Oct. 25.
Reach Washington Nov. 8.

We call this mission mysterious because of the remarkable character of its professed object as well as the rapidity of the race through four great European countries, which is wholly incompatible with a calm investigation of any question. Not only is the proposed object inadmissible, but the idea that the Treasury Department wanted to give three deserving officials a junket is equally so, for that could have been done without sending them out of the country or subjecting them to the strain of so high a speed. Among the other explanations advanced, the one we find easiest of acceptance is that this party has been sent out for the purpose of finding a soft place for the national administration to fall on when the German tariff agreement comes before Congress for settlement next winter.

In this connection it may be well to state



ROUTE TAKEN BY THE COMMISSION INVESTIGATING THE TARIFF RELATIONS BETWEEN THE UNITED STATES AND EUROPE.

that the political interests of the present or any administration are of slight importance compared with the millions of people whose welfare is involved in this question. At the present time business is showing unmistakable signs of slackening and foreign manufactures are being imported and dumped into the country at an unprecedented rate. At such a time the first duty of the administration is to enforce the laws protecting American industries against the products of cheap foreign labor, and not to save its face by having a commission collect, at the rate of 150 miles a day, "complaints against the American customs laws" from every part of Europe, and from this undigested material compile an indigestible "report" to be presented to the Secretary of the Treasury about the first Monday in December.

A New Silk Conditioning House.

The importance of conditioning textile materials and the meager facilities existing in this country for that work make the establishment of a new conditioning house worthy of special notice. The United States Silk Conditioning House has recently been organized and a conditioning plant is now being installed at 472 Broome St., New York. The following account of the enterprise is taken from the semi-annual review of the silk trade by the Silk Association of America:

Part of the testing machinery and scientific apparatus has already arrived from Zurich, Switzerland. Four conditioning ovens of the latest and most improved type, and apparatus to make sizing tests, from Milan, arrived in New York on August 27th. The remaining apparatus was ordered from the best machinists in their respective lines in the United States, and is about to be installed. At the outset the capacity of the establishment for testing purposes will be 1,000 bales per month.

The subscribers to the capital stock of the company number 71 of the largest and most influential silk manufacturing establishments, and the most prominent raw silk importers, located in the United States. Every branch of the industry is represented by the shareholders, and the affairs of the company are supervised by a board of fifteen directors and by an executive committee of five members. The manager of the establishment has been selected for his skill and tried experience in raw silk, both in Europe and China, and for the past three years he has been second in command of one of the principal silk conditioning establishments in Europe. The gentleman speaks four languages, English, French, German and Italian.

Being thus organized, and with this personnel, the United States Silk Conditioning Company plans to represent worthily the aspirations of the American silk industry for a conditioning establishment which shall be in harmony with and as perfect in its technical processes as any similar establishment in the world.

Foreign Postage.

On the first of the present month, October, 1907, an important change was made in the rate of postage on foreign letters, in accordance with the arrangement made by the Universal Postal Congress at Rome, in May, 1906. On letters sent from the United States to foreign countries the postage is now five cents for the first ounce and three cents for each additional ounce or fraction thereof. This is a much lower rate than the old one, which was five cents for each half ounce or fraction thereof. Under date of June 12, 1906, the United States Post Office Department issued the following statement regarding the changes made by the Rome Congress:

"The Universal Postal Congress ordered a substantial reduction in letter postage by increasing the unit of weight, effective on and after October 1, 1907, from 15 to 20 grammes, and providing that while postage on the first 20 grammes shall remain at 25 centimes (five cents) every additional 20 grammes shall be at the rate of 15 centimes (three cents). Great Britain and the United States strongly urged that the unit of weight for them should be fixed at one ounce, as it would be extremely difficult for them to express an equivalent weight for 20 grammes, not having adopted the metric system. This request was granted. When the new rate becomes effective a letter weighing six ounces can be sent to Great Britain at the rate now charged for a two-ounce packet."

By the new arrangement English-speaking countries with the ounce unit will have much lower rates of postage on foreign letters than so-called metric countries with the 20-gramme unit. This advantage is shown by the following comparison of foreign rates of postage in the two classes of countries:

Weight of letter.	If mailed in English speaking countries.	If mailed in so-called metric countries.
1 oz. (28.34 gr.)	5 cents	8 cents
2 oz. (56.68 gr.)	8 cents	11 cents
3 oz. (85.02 gr.)	11 cents	17 cents
4 oz. (113.36 gr.)	14 cents	20 cents
5 oz. (141.70 gr.)	17 cents	26 cents
6 oz. (170.04 gr.)	20 cents	29 cents

It would not be surprising if an agitation should be started in so-called metric countries to remove this discrimination and secure the adoption either of the English ounce or of 30 grammes as a basis for letter postage. The present rate in English-speaking countries is a cause for gratification not only because of the reduced cost of foreign letter postage, but because of the united action of English-speaking countries which brought it about and prevented the adoption of a metric basis. It is to be hoped that the reduced rate will whet the popular and official appetite for a universal two-cent rate between all parts of the world.

European Bankers to Reject Irregular Cotton Bills of Lading.

The Association of Liverpool Bankers issued the following notice to their customers regarding cotton bills of lading:

Dear Sir: You are doubtless aware that during the cotton season 1906-7 the practice materially increased, especially in Texas, of shipping cotton from an interior point, financed by a Bill of Exchange dated at such point, with Bill of Lading attached as collateral purporting to be dated at the seaport whence the cotton was intended to be ocean borne. These Bills of Lading stated that the cotton had been "shipped or received for shipment," whereas, at the time the Bill of Lading was issued, the goods were almost invariably still lying at the interior point.

A further serious irregularity was that, in many cases, the Bills of Lading were signed by parties not duly authorized to sign on behalf of the ship or line of steamers named in the Bill of Lading.

It was obvious that documents containing irregularities of this kind could not be regarded as satisfactorily collateral. Accordingly a conference was held in Liverpool on 24th ultimo to consider the question generally. The conference was attended not only by representatives of the cotton industry, but by shipowners, underwriters, and bankers.

We enclose an official report of the proceedings of the conference, and beg to draw your pointed attention to the resolution contained on page 7 of the report. That resolution was passed unanimously, and it has the support of the whole of the English banks engaged in financing cotton, and also of leading interests of the Continent.

It is now essential that steps be taken to give effect to the terms of the resolution, and our object in drawing your attention to the proceedings is to enlist your valuable support in the abolition of irregular Bills of Lading and the employment only of the two classes of Bills of Lading approved by the conference, viz:—

(a) A Through Bill of Lading so drawn as to establish the continuity of responsibility of the several carriers from the interior point to the ultimate European or other foreign destination; or,

(b) A Port Bill of Lading duly signed on behalf of the steamer by the captain or other authorized agent after receipt of the goods into the custody of such captain or other authorized agent at the port of shipment.

We, together with all the Bankers represented at the conference, take so serious a view of the dangers to which shippers, merchants, brokers, and bankers are exposed by the irregularities referred to, that we feel it incumbent upon us to inform cotton shippers and merchants, and buyers of cotton drafts, that we do not see our way to continue to accept or make advances against Bills of Lading containing such irregularities. We have not fixed any definite date after which we will decline irregular Bills of Lading, but we hope and expect that every effort will be made by all concerned to procure, with the least possible delay, and at latest by the end of this year, the adoption of the forms of Bills of Lading approved by the conference and the abolition of all irregular forms.

We need hardly say that if cotton Bills of Lading with which you are concerned are already in proper form no notice need be taken of this circular. Yours faithfully,

T. F. A. Agnew, Chairman of the Association of Liverpool Clearing Bankers,
Bank of Liverpool, Ltd.,
Lancashire and Yorkshire Bank, Ltd.,
Lloyds' Bank, Ltd.,
London, City and Midland Bank, Ltd.,
London and Provincial Bank, Ltd.,
Manchester and Liverpool District Banking Co., Ltd.,
National Provincial Bank of England, Ltd.,
North and South Wales Bank, Ltd.,
Parr's Bank, Ltd.,
Union Bank of Manchester, Ltd.,
Members of the above Association.

The sub-committee appointed by the Liverpool conference, the proceedings of which were reported in our September issue, sent a letter to the different steamship lines represented at Liverpool, and in reply the following companies stated their willingness to issue port bills of lading signed by their agents only when the cotton is actually delivered to the ship: American Line, Booth Steamship Co., Cunard Co., Dominion Line, G. H. Fletcher & Co., Greenshields, Cowie & Co., T. & J. Harrison, Joseph Hoult, Lamport & Holt, Larrinaga & Co., Leyland Line, Geo. Lingham & Co., Rankin, Gilmour & Co., Sierra Steamship Co., W. H. Watts, Watts & Co., and White Star Line.

Seventy-six per cent. of the cotton operatives in Great Britain are in Lancashire.

Fifteen-Cent Cotton.

It may not be generally known, but the wooden spools on which the (sewing) thread is wound cost the manufacturer more money than does the raw cotton out of which the thread is made. This is due to the fact that the lumber men know how to sell the product of their labor profitably while the cotton growers do not.—The Cotton Journal, Harvie Jordan, editor, Atlanta, Ga.

We subjected that statement to a test by measuring the British and American spools illustrated in our August issue, allowing 20 per cent. for waste of both wood and cotton, and calculating that the wood used for the spool and the cotton used for the thread wound on it cost the same. With long staple cotton at 30 cents a pound the lumber used for American spools would on this basis cost $530 a thousand feet, that used for the British spool would cost $690 per thousand feet.

The Cotton Journal's statement should not be accepted on the assumption that its editor was figuring on spools made of mohogony, rosewood or ebony; it should be rejected with the certainty that the editor was simply guessing and not figuring at all. On the front page of the issue containing this absurdity about the cost of wood and cotton is found in display type this proclamation regarding 15-cent cotton, basis middling:

Five reasons why cotton should bring 15 cents per pound.

1. Because it is worth that price.
2. Because the world is fully able to pay it and will need every bale produced this year for consumption during the next twelve months.
3. Because spinners have contracted their output at prices that will enable them to make handsome profits after paying 15 cents for the raw material.
4. Because the grower should and ought to have the profits that some one else will pocket, unless cotton should bring 15 cents.
5. Because the farmer, who is the foundation of the nation's wealth and credit, is entitled to a profit on his labor—is the best reason why

Cotton should bring 15 cents per pound.

Important.

We defy any one to contradict the above statement through the columns of this paper (The Cotton Journal).

Of the five "reasons" given by The Cotton Journal the fifth is an irrelevant platitude, while the other four are assumptions made with a total disregard of many unknown and complicated factors in the present and future relations between supply and demand. First, cotton is worth only what it will bring. Second, the world's ability to pay a price is no reason why that price should be paid, and the statement as to the production and consumption of cotton during the next twelve months is mere prophecy, the most unnecessary form of error. Third and fourth, profit by the world's spinners from present contracts and 15-cent cotton depends on the terms of the contracts and the cost of manufacturing in the different countries, conditions that cannot possibly be known to the editor of The Cotton Journal, to say nothing of his ability to figure the profit if they were known.

The price of cotton will not be affected by the proclamations of 10, 11 or 15-cent cotton by The Cotton Journal of Atlanta. High prices for cotton, which every American should welcome, will be obtained only by the operation of the law of supply and demand, in which the organization of planters, the improvement in the methods of raising, preparing for market and marketing cotton, and the adjustment of acreage to probable demand are important factors.

The Baling of Wool.

A conference of English worsted spinners and Australian wool growers was held at Bradford, Eng., Sept. 11, to consider the question of improving present methods of preparing wool for the market. There were present besides the worsted manufacturers seventeen wool growers and packers from Australia and New Zealand, and nineteen London wool importers and merchants representing the largest firms in the trade.

The most serious complaint was in regard to wrapping the bales in very coarse jute, which frays easily and becomes scattered through the wool causing much trouble to spinners and manufacturers. Those in attendance at the conference visited a large worsted mill at Bradford, where they examined a lot of Australian wool containing the objectionable jute. They also visited the warehouse of the Bradford Dyers' Association where finished goods were shown in which the jute specks appeared. One wor-

sted manufacturer stated that it cost him $10,000 a year to remove jute specks from the wool and goods in his mill and then the difficulty was but partially remedied. After the visits to the mills and warehouses there was a session of the conference at which ways and means for remedying the trouble were discussed. There was a general sentiment that the conference would result in bringing about an improvement, and it was decided to appoint a committee representing the wool growers, dealers and manufacturers to carry on the work. An estimate was made at the Bradford conference that the extra cost of a better grade of bagging to remedy the trouble would be not more than $50 for $10,000 worth of wool. Although the cost of the remedy would be low, it was recognized that there would be considerable difficulty in getting the numerous and widely scattered wool dealers to apply it.

The Price of Sewing Thread.

Archibald Coats, Esq., Chairman of J. &. P. Coats, Ltd., Tells Why It Has Been Advanced.

We are able in this issue to report further progress in the investigation started several months ago to determine the facts bearing on the question of prices for sewing thread. This inquiry was started because of the general misrepresentation and misconception of the subject by the press of the country. We soon discovered that the question to be investigated not only involved the advance of the retail price in the United States from 5 to 6 cents a spool, but the broader and far more significant fact that the prices of sewing thread for both Great Britain and the United States were regulated from Paisley, Scotland, and Manchester, England, and that under this control the American consumer was required to pay 6 cents for a 200-yard spool, while the British consumer received a 400-yard spool for the same price.

The only people who knew the facts regarding the comparative cost of production in American and British thread mills were the officials of the British companies that controlled both the American and British mills. An outsider, like ourselves, might eliminate certain items in the cost of production, such as raw materials and spools, that are the same or vary but slightly between the two countries, and might then form a fairly well-founded opinion as to whether the difference between the American and British prices was justified by the difference in the remaining items. There remained, however, so many unknown factors that we concluded to lay the matter before the Chairman of Coats, Limited, at Paisley, Scotland, and ask him frankly to take 90,000,000 Americans into his confidence. This we did in the letter dated August 9, printed below. With this letter we enclosed a number of clippings from American papers, commenting on the price of thread; most of these were similar in tone to the extract from the Philadelphia Record, published in our July issue, and were sent simply to give an idea of the prevailing public sentiment, which the press both reflects and creates.

The reply to this letter is also given below, along with a liberal extract from the Chairman's speech at the annual meeting of J. & P. Coats, Limited, Nov. 29, 1906.

We submit this correspondence for the information of the public, believing that it will prove of material assistance in reaching a fair conclusion regarding a difficult question that is not only of much importance in itself, but has an important bearing on the broad issue of business combinations, an issue not only of national but of world-wide scope. There is but one point raised by Mr. Coats, on which we will comment here. He questions the correctness of the basis of our comparison of prices, which was between the 200-yard American spool sold for 6 cents, and the 400-yard British spool at the same price, and states that the 200-yard British spool is the standard length and is sold for 1 3/4d (3 1/2 cents) and 2d (4 cents). Without questioning the correctness of his quota-

tions, we will state that our English representative advised us in reply to an enquiry made some time ago, before Mr. Coats' letter was received, that "the general retail prices of all makes are: 100 yards, 1d (2 cents); 200 yards, 1 1/2d (3 cents); and 400 yards, 3d (6 cents)." Mr. Coats and our representative agree as to the price of 400 yards, and we shall until better advised accept the statements of both regarding the 100- and 200-yard spools, and assume that the different quotations are based on different brands or are due to the variation in prices between different localities. We recognize the difficulty in finding one grade or locality that will correctly represent the average of thousands. Moreover, while the manufacturer may choose a given number of yards as the standard for prices, the purchaser at retail might prefer the purchasing power of 6 cents for the same purpose.

Mr. Archibald Coats, Chairman of J. & P. Coats, Limited, Paisley, Scotland.

Dear Sir: I am aware that at first thought it may seem like an unwarranted intrusion on my part to call your attention to matters affecting the relations between your company and the American consumers of your thread, but I feel I am justified by the peculiar conditions existing at present.

Some weeks ago your company advanced the price to jobbers of ordinary sewing cotton from 55 to 67 cents a dozen, making necessary an advance from 5 to 6 cents a spool at retail. This change in the price of an article of general necessity naturally attracted the attention of every one, and the press immediately reflected the opinion of the public. I am sending you with this letter clippings from a number of newspapers in various parts of the country commenting on the increase in the price of thread, and which represent the tone of items on the same subject from hundreds of other papers we have received from all parts of the country. I am not sending these clippings because I agree or disagree with the sentiments there expressed, but to give you evidence of the prevailing public sentiment toward your corporation.

You will find in them the natural surprise that a price heretofore so stable as that of thread should be changed; there is the call for an explanation; resentment because none is offered; a desire for redress; the realization that the thread they want to buy is made by only one or two corporations monopolizing the business not only in the United States, but in foreign countries as well; an overpowering sense of helplessness; an unthinking desire for redress by striking down the tariff; and finally an appeal to the government to protect them from the rapacity of a trust.

When the advance in price was first announced without any justifying explanation from you and the public had been left to search blindly for the reason and the remedy, it occurred to me that I would be benefiting not only the consumers, but you, the producers, as well, by determining as far as possible the facts regarding the advance in price.

Accordingly I purchased a quantity of Coats' thread in Boston, weighed and measured it, with the results given in the accompanying article from our July issue. I made diligent inquiries among Boston merchants regarding the methods of marketing thread, and at the same time asked some thoroughly reliable correspondents in Canada and England to obtain and send to me similar information as to the thread trade in those countries. In the enclosed article cut from our August issue you will find a statement of the information thus obtained from England. Also enclosed is a copy of the report from Canada, and to avoid making this letter tedious I will ask you to consider it, as well as the clippings from the July and August issues of the magazine, as a part of the letter.

This inquiry on my part and, I believe, on the part of our correspondents, has been made with but one object in view; namely, to find out and state the facts. I realize, however, the difficulties under which a Boston journalist labors in investigating the British, Canadian and American thread trade in a space of four or five weeks. The information is undoubtedly incomplete, but it discloses one fact of great importance; that is, that your corporation charges the consumer as much for a 200-yard spool of Coats' thread in America as you charge for a 400-yard spool in England. That the price of a manufactured product like sewing thread should be higher in the United States than in England is to be expected. I shall not touch upon the causes further than to state my belief that the great majority of consumers in this country expect that the products of high-priced labor will cost more to the consumer. There is, however, a limit to the advance that can be justified by the American cost of production, and the fact that your corporation is charging the people of the United States twice as much as you are charging the people of England, affords good grounds for the suspicion that the price is fixed arbitrarily, and that finding yourselves in control of the sewing thread business you are charging in each country all the consumer can pay. I am not stating this as my belief, but merely saying that the difference affords good grounds for the suspicion.

To follow the example of the ranters who wrote many of the newspaper items enclosed would lead me to treat that suspicion as an established fact, and hold your company up before our readers as a business combine guilty of extortion and deserving suppression. Instead, however, of adopting that easy but very unfair course, I have decided to bring the whole matter to your attention and ask you to take the American people iinto your confidence and without reservation or evasion give them an explanation not only of the advance in the price of your thread, but of the difference in the cost to the British and the American consumer.

This request might be deemed by many as unreasonable because calculated to disclose business details to people who have no right to the information, but I have a certain confidence that it will appeal to you in its broader sense as being entirely reasonable, and that a compliance on your part will be for the benefit of all concerned. To withhold that explanation will surely strengthen the growing

animosity and resentment toward your company that find expression now both in public and private. If the advance and the difference in price are justifiable the consumer should know it. If they are not, then the injustice should be righted by a readjustment of prices. In other words, the price of thread to the American consumer should either be justified or lowered. It would certainly increase the reputation and good-will of your corporation to give proof that you recognize that fact. It would redound all the more to your advantage by showing the American public that a British business combination or trust shows more consideration for them and a higher sense of justice than have the majority of trusts of American origin. It would also give gratifying proof that the growth of a business to the colossal size of yours does not necessarily mean the loss of the friendly relations and the good understanding that existed between the employer, the employe and the consumer of the goods when James Clark and James Coats began the manufacture of thread at Paisley.

Yours very truly,
Samuel S. Dale,
Editor.

J. & P. Coats, Limited,
Ferguslie Thread Works,
Paisley.

Glasgow, 5th September, 1907.

Editor Textile World Record:

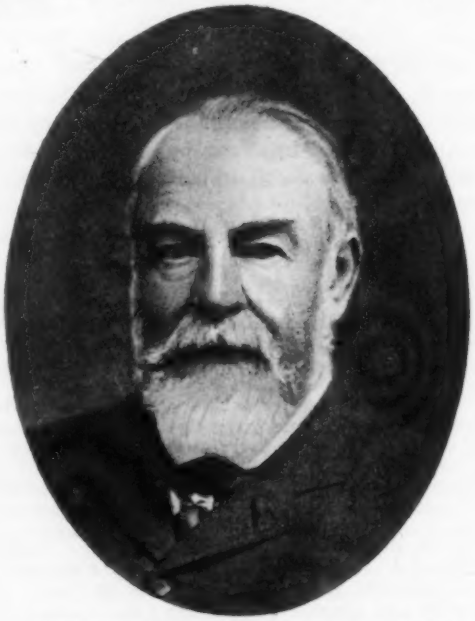
Dear Sir: My son wrote to you on 27th August that your letter of 9th August had been duly received but that I was away from business and would attend to it on my return.

You show so evident a desire to be fair, that I do not hesitate to write you at length in reply to your communication, although, as a rule, I take no notice of newspaper comments upon our business, they being frequently based upon erroneous information, misconception and prejudice.

You very correctly call the writers of the articles you enclose "ranters," and I quite agree with your remark, that they have not made the slightest attempt to understand the reason why the price of spool cotton was advanced, that their comments upon the advance are unfair and are merely dictated by the desire to stir up discontent.

You, on the other hand, seem to have taken immense trouble to investigate the matter, and I am not surprised that the more you have enquired into it the better you have realized the difficulty of avoiding erroneous conclusions.

Before dealing with the main subject, I wish to point out that you are mistaken in saying that natural surprise was felt when the price of spool cotton was raised and that the public was left to search blindly for the cause. There is not a purchaser of the article who can by any possible means be unaware of the fact that the prices of all goods made from cotton have risen enormously in recent years, in some cases by more than 50 per cent. I believe I am also correct in saying that the public generally knows full well that, in consequence of the enhanced cost of production, resulting from a large increase in the price of nearly every class of raw material, of fuel and of wages, there is hardly a single manufactured article which has not become much dearer. Under these circumstances there could be no reasonable ground for surprise when the price of spool cotton was advanced. As the retail price of 200 yards cannot be increased by fractions of a cent, the manufacturer is compelled to abstain from making successive small advances as the cost of production increases. Not only we,



ARCHIBALD COATS, CHAIRMAN OF J. & P. COATS, LIMITED.

but all other manufacturers, have during the last few years made such successive advances in the price of cotton thread on large spools, cops or in hanks, the increase in price amounting in the aggregate to more than 20 per cent., while, for the reason given, the price of 200 yards remained unchanged for a long number of years, notwithstanding the gradual and very material increase in the cost of manufacture, culminating last season in a further advance in the price of cotton of about 50 per cent. In a circular issued in July last it was explained that the total advance in the price of the cotton we use has been 134 per cent., that wages have gone up 24 per cent., spools 41 per cent., coal 22 per cent. and general supplies 119 per cent.

Surely it is easy to understand from the foregoing that, when the price of 200 yds. spool cotton was at last raised, the advance had to be a considerable one, and it is downright nonsense to call it arbitrary and say that there was no justification for it whatever.

Let me point out that it is a mistake to assume that the manufacturer receives 12 cents per dozen more than formerly; the increase in his price being subject to discounts which he allows to the middleman, the net advance is less than 10 cents. About two-thirds of this advance go to the grower of the cotton, leaving only one-third as a set-off against the increase in wages, coal, etc.

To recapitulate, we made an advance of only 20 per cent. when our cost of production had already gone up more than 35 per cent., and it should surely be apparent to the meanest understanding that in these circumstances the attacks made upon us are not only unwarranted but absolutely irrational. It is monstrous to single out spool cotton as the only article which must never be advanced, no matter how much the cost of producing it increases.

Being familiar with questions affecting the manufacture of textile goods generally, you will readily understand that the weight of the thread wound on a spool cannot form a reliable basis for any calculation of value, in the absence of detailed information as to the weight and quality of the cotton we require to make a pound of our quality of thread in the different numbers, both weight and quality varying enormously. The finished article has to be sold at an average price, but the cost of the individual numbers differs largely, and the variation is a fluctuating one, as the relative value of the different descriptions and grades of cotton used by us is subject to important changes, the price of one kind not infrequently increasing when that of another declines. The quantities sold of the different numbers respectively vary very much also, in some parts of the country more fine numbers are sold than in others, more black than white, etc. The great importance of this point will at once be apparent when I tell you that we sell very large quantities of Nos. 8, 30 and 36, and hardly anything of Nos. 110 and 200. In a large number of towns it would not be possible to find a single spool of either. Your calculation of the average increase based upon the supposition that all or even many of the numbers are consumed in equal proportions is, therefore, bound to lead to erroneous conclusions. You would probably be surprised if you knew the real figures, but I cannot, of course, enter into a discussion of all the details of our business, and you can see for yourself that even by only leaving out numbers 110 and 200 you at once reduce to 54 the figure of 79 1/2, which you supposed to be the average.

I now come to the question of your comparison of the prices of spool cotton in the United States with those ruling in this country, and must in the first place point out that your basis is not a correct one, the standard length here being the same as with you, viz, 200 yards, which is sold at 1 3/4 and 2 pence, equal to 3 1/2 and 4 cents, and these 200-yard spools can be retailed at 5 cents in America if dealers are willing to sell the article with an inadequate profit, which is but too frequently done in this country.

There are many points of difference which render it impossible for any outsider to make a fair comparison. I have already referred to the variations in the assortment of numbers and the circumstance that these greatly influence the average cost of manufacturing. I may also mention that, whereas the 200 yards are sold in the United States in boxes, they are in this country supplied in paper wrappers, and that there are numerous other differences, but, of course, the main point is, that in making a comparison, you have to take into account not only that wages in America are more than twice as high as in this country but that the whole plant, buildings, machinery, etc., are infinitely more costly and the charges for depreciation, interest on capital, etc., correspondingly greater. The same must be said of the expenses of distribution, salaries of agents, salesmen and travelers, rents of depots, freight, etc. All the conditions of life, and consequently of trade and manufacture, are different, and it would be absurd to expect the American manufacturer to be the only one whose profit should not be governed thereby. The consumer, who pays more for what he buys, earns more in proportion, and that this has an immediate bearing upon the question at issue is shown by the fact that the price of 6 cents, at which our thread is retailed in the United States, comprises a very much higher profit for the jobber and retailer than the middleman in this country has to be satisfied with, where spool cotton is sold with a margin which, it is commonly said, does not cover expenses.

You incidentally refer to it being said that the spool cotton business is monopolized in the United States and in other countries by one or two corporations. I dealt with this matter exhaustively in my last year's address to our shareholders, of which I send you copy. You will see from the passages I have marked that our profits are large on account of our large turnover, of our being able to manufacture more cheaply than others and on account of other perfectly legitimate advantages. You will also see from the enclosure that there is

no justification for the assumption that we have a monopoly or that any attempt has been made to create one.

You should in common fairness give, in the next issue of your paper, the full text of this reply to your letter and articles, so as to let your readers have an opportunity of hearing the other side.

Thanking you for the opportunity you have given me to put the matter before you in its true light, I remain, dear sir,

Yours truly,

Archibald Coats,

Chairman of J. & P. Coats, Ltd.

Address by the Chairman at the annual meeting of J. & P. Coats, Ltd., at Glasgow, Nov. 29, 1906:

QUESTION OF MONOPOLY.

It is exactly ten years since, when, in addressing you in this hall, I dealt with the assertion that we had a monopoly, or, as some prefer to call it, a "virtual monopoly," of the sewing cotton trade of the world. To show you how entirely unfounded such an assertion is, I then stated that there were in this country, outside of the concerns in which we are interested, more than twenty sewing cotton manufacturers of varying importance, that on the Continent of Europe there were over forty, and in the United States two concerns of the first importance and numerous smaller makers, that a goodly proportion of these competitors employ a large number of workpeople, and that the capital invested in the trade amounted to a good many millions sterling. As a matter of fact, there are at the present moment about 180 makers of sewing cotton, not including those in which we have an interest; and yet people still talk of a monopoly. I may add that the number given includes over 170 with whom we neither have, nor ever had, any agreement as to prices or terms. They sell wherever it suits them to do so, at whatever prices they please, and as the great bulk of our trade is done outside of the United Kingdom, the number of competitors manufacturing in this country is of less importance to us than the number of makers abroad.

On the same occasion, that is to say, ten years ago, I gave you the assurance that our business rested upon a more secure basis than a monopoly would furnish, that we were in an exceptionally strong position as regards cost of production, efficient and economical distribution, and the esteem in which our goods were held by the consumer. (Hear, hear.) I stated that this would enable us to make very satisfactory profits out of prices which yielded but a moderate return to the great majority of our competitors, and offered little inducement to others to enter a trade already so keenly competed for. That statement, which correctly described our position ten years ago, holds good today.

Is there any business man worthy of the name who does not understand that with so large a turnover, with abundant capital, and with the best manufacturing plant which it is possible to procure, our cost of manufacturing must be below that of competitors not so favorably situated; that with a selling organization much more efficient than that possessed by any other concern, we are enabled to distribute our goods to greater advantage and at smaller cost—(hear, hear)—and that, if in addition thereto the esteem in which our goods are held by the consumer enables us to obtain higher prices than others, large profits are the natural result of these perfectly legitimate advantages? If it were necessary to give an illustration, I might add that, if our cost of manufacturing is less by 5 per cent., our selling expenses less by a like percentage, and if, in addition thereto, the consumer willingly pays 5 per cent. more for our goods, it is easy to see that our profits are bound to be much larger than those of our competitors.

THE COMPANY'S ADVANTAGES.

Do the people who are so ready to criticise ever stop to think that our enjoying these advantages cannot be purely accidental? May it not, on the contrary, be reasonably assumed that the strong position we now hold is the fruit of our labor? To build up a business yielding a yearly profit of several millions is not quite the simple matter our critics appear to think; it has taken the better part of a century to do so, and those who know anything about the sewing cotton trade cannot ignore the fact that numerous firms who were in this trade thirty, forty, and fifty years ago had to liquidate, having failed to make it a success, while others who had the same opportunities as ourselves have not made the most of them.

Our turnover in the aggregate is a very large one, but few people have any conception how small are its component parts, what a petty business it is to sell hundreds of varieties adapted to the requirements of hundreds of markets, and involving a mass of detail which requires constant attention and careful management. We have twenty different manufacturing concerns in various parts of the world to look after, hundreds of branch houses and depots, and the number of our ledger accounts exceeds 100,000. These figures will give you some idea of the details requiring daily attention, and the necessity for a carefully devised and efficient organization to cope with them.

If we had neglected our opportunities, failed to increase the earning capacity of the business, abstained from perfecting our organization and from introducing economies in the process of manufacturing and the methods of distribution, we should, of course, have escaped the criticism of Mr. Chiozza Money and Mr. Keir Hardie. You will readily understand that I do not mention these things in order to blow our own trumpet; you know that in the past we have taken very little notice of what was said about the company or about those responsible for the conduct of the business, and have pursued the even tenor of our way, but when agitators, be they in Parliament or out of it, start a campaign of slander, and are unscrupulous enough to say that our profit has been wrung from underpaid mill girls, we think it time to speak out. (Applause.)

I am glad to say that the great majority of our Paisley girls are far too shrewd to be deceived by the humbug that has been dished up to them, in order to get them to part with a portion of their earnings by way of contribution to funds which are used for the purpose of agitation in other trades and the fostering of strife. The attempts to make our workers dissatisfied have so far met with little success, although it must not be overlooked that amongst so many there is bound to be a certain

number who think they have cause to complain, and those are almost invariably the worst workers, who would not be able to make good wages under almost any conditions. (Laughter.) It is a well-known fact that those least inclined to do an honest day's work are, as a rule, the greatest spouters, and that empty vessels make the most sound.

EFFECT OF AMALGAMATION.

You will remember that, after the amalgamation in 1896, many people expected that the business would yield largely increased profits in the near future, almost immediately, and that there was much disappointment when this expectation was not realized. Some years later, when there had been a considerable increase, I told you at our annual meeting that much had been done to cheapen production and lessen the expense of distribution, but that more remained to be done, and that our unremitting efforts would be directed to increased efficiency and economy. The profit for the first five years following the amalgamation averaged, roughly, £1,800,000 ($8,748,000) per annum; that of the subsequent five years, £2,600,000 ($12,636,000).

That last year's profit has been so very much larger than the average is not of any special significance. The total is formed of such an immense number of fluctuating items that it is often purely accidental that one year is better or worse than another. Unusually large purchases in some market on account of an impending alteration in the tariff, foreign exchanges, the prices at which stocks have to be valued in accordance with a fixed rule, and a variety of other causes, may increase or lessen the profit of a particular year without there being any material change in the condition and profitableness of the business generally. In the year under review there was a not inconsiderable increase in sales, resulting probably from the increased consumption of cotton goods which, it is well known, has benefited Lancashire in so marked a degree.

The population of Great Britain is roughly 45,000,000, but we supply a not inconsiderable proportion of the sewing cotton required by many hundreds of millions inhabiting other countries. Only a small portion of our profit is derived from the home trade. Is there anything in this that we need be ashamed of? From the way in which the profit we make is denounced one would almost suppose so. There are never-ending complaints that the ratio of increase in manufacturing is so much greater in other countries than in Great Britain, and, as a matter of fact, many of our industries have unquestionably lost the commanding position in the world's markets which they occupied in former years. This is not the case in the sewing cotton industry. In spite of foreign tariffs and of foreign competition we hold our own. In the face of said complaints, it seems to me an extraordinary thing that, instead of our success being a source of legitimate pride to those of our countrymen who do us the honor of taking notice of our prosperity, we are looked upon as a species of malefactor to whose dark and evil doings Mr. Chiozza Money and Mr. Keir Hardie and other self-appointed guardians of the welfare of the British Empire and people must draw the attention of the Government and of the public. (Hear, hear.)

REPLY TO ACCUSERS.

I should like to say a few words with regard to the accusation that our aim has been to crush our rivals in trade, an accusation which is so untruthful that we should not take the trouble to notice it were it not unfortunately the case that some people act upon the principle that if they only throw sufficient mud some of it will stick, and that however unjust an accusation may be, there is always some chance of it being believed if it goes uncontradicted. We have neither interfered nor attempted to interfere with the trade of our competitors as long as they did not attack ours.

Our largest competitor is the English Sewing Cotton Company. The admitted want of efficient management brought this company to the verge of liquidation. We were repeatedly urged to take over the business, but declined, as we did not wish to profit by the misfortunes of the 10,000 or more shareholders of that company. Instead of profiting by the opportunity, we offered our assistance to get it out of its troubles, a loan of £400,000 ($1,944,000) to regulate its financial position, and elaborated a scheme for reorganizing and improving its manufacturing arrangements. I ask you whether that is the action of people who are intent upon crushing their rivals, who are so keen to make money that all means are good enough for them if only they help to pile up profits? The only people who could find fault with your directors are our shareholders, as it is rather unusual for a company to lend assistance to a competitor when the latter is in difficulties. Our holding of 100,000 shares in the English Sewing Cotton Company is, of course, a trivial matter compared to the advantage we should have derived had that company gone into liquidation, or continued in the unsatisfactory condition in which it found itself five years ago.

I should also refer to the fact that you are now reaping the benefit of our having made it a rule only to distribute a portion of the profits in spite of our having often been found fault with for doing so. For a number of years the dividends paid on our Ordinary shares represented merely one-half of what we might have distributed, the greater part of the surplus being re-invested with very satisfactory results. As is clearly shown in our balance-sheet, there were, on June 30 last, assets of the value of about eight millions sterling ($38,880,000) which are not included in the amount representing the cost of the business, of the mills and machinery, of all the shares in subsidiary companies, and of funds which we have furnished to the latter for extensions. It is therefore downright nonsense to say that the capital of our company of ten millions sterling ($48,600,000), together with about one million ($4,860,000) borrowed on Debentures, was sufficient to produce a profit of nearly three millions sterling ($14,580,000), and that Mr. Chiozza Money and similar critics have failed to understand this only shows their ignorance and the shallowness of their judgment.

TACTICS OF AGITATORS.

Mr. Chiozza Money asked the President of the Board of Trade whether he was aware that we now sell 130 yards of sewing cotton at the same price at which we used to sell 200 yards; that the increase in price is not accounted for by an increase in cost of production; and whether he could see his way,

by legislation or otherwise, to protect the consumers of sewing cotton, who are mostly poor people. Therefore, according to Mr. Chiozza Money, we have raised our price by about 50 per cent. Another statement to which my attention has been drawn is that, where the consumer formerly got two spools of 6-cord for 1 1/2d. (3 cents), the price is now 2 1/2d. (5 cents); this would mean an increase in the cost of the article of about 65 per cent. In a letter published by the Daily Record and Mail it was even said that 100 yards cost at present as much as 200 yards before the monopoly was established.

Now for the facts of the case. Since the amalgamation our average price of the standard length of 200 yards 6-cord, which is taken as the basis for the price of the other lengths, has been less than twopence (4 cents) per gross of 144 spools higher than the average price ruling during the twenty-five years preceding the amalgamation; but, taking into account the larger discounts we have allowed to our customers since the amalgamation, the net price we charge is actually less. On the other hand, wages have risen considerably, and the cost of the cotton we use, as well as of coal, is much higher than formerly, while spool-wood, which is also an important item, has become much dearer. We pay at present for the bulk of our supplies of wood 25 to 30 per cent. more than formerly. Does it not seem extraordinary that men like Mr. Chiozza Money, who not only pretend to be students of economic subjects, but actually think themselves called upon to enlighten others, should not take the trouble first to inform themselves about matters of this kind?

The most despicable means have been resorted to in attacking us, for the purpose of causing trouble with our workers and of misleading the public. The articles published in a weekly Labor journal confirm this. The paper was edited by a man calling himself a minister of religion, and week after week it contained lies about the "tyrannical rules" in force in our mills, and the attempts of the management to devise means for bringing down the wages of the girls, who were represented to be working in a temperature of from 80 to 100 degrees, and leading a life which, it was said, might at a stretch be termed slavery. Fair treatment, it was asserted, was denied them, they had not enough to live upon, and were bullied by the managers and foremen with all the subtlety and experience acquired in hectoring generations of hysterical females. I quote the very words used.

Now, I can tell you that a better and more respectable class of girls than our workers does not exist in the whole kingdom—(applause)—and yet this Socialistic agitator had the impudence to say in his Labor journal that the low wages of the girls drive them to immorality, and that the results can be seen in the streets of Paisley any night of the week, Sunday included. ("Shame.") This man and his associates brought Mr. Keir Hardie and others to Paisley to help in fostering the agitation by delivering speeches to our workers, and it says a great deal for the good sense of the latter that the great majority of them turned a deaf ear to the harangues to which they were treated. And what happened next? When the noble and disinterested upholders of the rights of labor had had their say, and had increased the circulation of their paper by making these weekly attacks upon the employers of the poor down-trodden workers for whom such deep sympathy was displayed, one of our directors received a polite note intimating that the Labor journal in which the articles had appeared was for sale.

Some of you may think that I have treated this subject at unnecessary length. It is, however, not only of importance to us as employers, but also for the interests of the workers, that they should clearly understand the nature of the attempts made to hoodwink them, and nothing can be more injurious to the industries of the country, and to employed and employers alike, than the fostering of enmity between the two. To do so appears, however, to be the chief aim of the agitator. No lie is too palpable, no slander too foul, when that is the aim in view.

I have already in former years told you that the bulk of our profit is derived from our business and mills abroad. More than one-half is made on goods which are not manufactured in this country at all. Of the output of our home mills by far the greater portion is exported, and not one-fifth is sold in this country. As you are aware, a gigantic manufacturing plant in Great Britain, the United States, and half a dozen other countries, costing many millions sterling, together with other assets of the value of more than eight millions sterling ($38,880,000), were required to produce our profit, not to speak of the labor of several generations. And what did Mr. Keir Hardie say at a public meeting held on the 4th inst. in Edinburgh under the auspices of the Independent Labor Party? "In the Glasgow Herald appeared the balance-sheet of J. and P. Coats, Limited, showing profits roughly amounting to two and three-quarter millions sterling ($13,365,000), wrung, every penny, out of the labor of underpaid girls." Did anyone ever hear such silly nonsense? Mr. Keir Hardie must have had a terribly poor opinion of the intelligence of his audience to treat them to such trash, or is it that the cause which the leader of the Labor party champions is so weak that it must at all hazards be bolstered up by reckless misrepresentations?

Spontaneous Combustion in Wool.

In another part of this issue will be found a report on spontaneous combustion in wool by a commission appointed in August, 1906, by the governor of New Zealand. The object of the inquiry was to determine the cause of numerous fires on ships loaded with wool, flax and tow. The evidence submitted fills a bulky volume and testifies to the care with which the commissioners performed the duty assigned to them. The evidence as weighed by the commission was against the theory of spontaneous ignition of ordinary greasy wool, but indicated that spontaneous combustion had caused numerous fires in the case of pulled wool, locks and pieces.

The report refers to false packing of New Zealand wool, an evil that exists in all wool growing countries and which causes heavy losses to woolen and worsted manufacturers.

The Cotton Conference at Atlanta.

An audience of more than a thousand delegates faced Chairman James R. MacColl when he called the Second International Cotton Conference to order on Monday, Oct. 7, in the hall of the Georgia House of Representatives. One hundred and seven of this number were European delegates who had traveled from 4,000 to 5,000 miles for the purpose of attending this meeting.

On the way to Atlanta the excursion train stopped at Charlotte, N. C., where a cotton ginnery and compress were inspected, and a reception held at the Manufacturers' Club. The ginnery, like the mill, is surrounded by growing cotton now in bloom. These surroundings were absolutely new to the European cotton men, but the chief attraction at Highland Park Mill was the new method of ginning cotton, which this season has gone into service there. Instead of the Whitney saw gin, a tooth and combing equipment is used for separating the seed from the lint. As Lancashire spinners have long complained of gin cut cotton they were keenly interested in the new process, which, it is claimed, obviates this and other drawbacks from the spinners' point of view which attend the use of the old-fashioned saw gin.

A reception at Greenville, S. C., was another enjoyable feature of the trip. Here addresses were made by Gov. Ansel, the Mayor of Greenville, Senator Latimer, C. W. Macara, Arthur Kuffler, James R. MacColl, and Wm. D. Hartshorne. The reception was held at the Country Club, and among those present was Capt. Smythe, who gave the visitors a warm welcome.

An equal number of representatives of the American spinning and manufacturing industry were present at the Atlanta meeting, while the planters to the number of 800 to 900 made up the remainder. All were evidently in earnest and deeply interested in the proceedings. Mr. MacColl's address was in part as follows:

President MacColl's Address.

In calling this second conference of growers and manufacturers to order, it may be advisable to state briefly some of the purposes aimed at, and the results hoped to be achieved, by the coming together of so large and influential a body of men, representing every branch of the cotton industry. The movement tending towards closer relations between growers and spinners was inaugurated at the Washington meeting of last year, and it was then felt by all who took part that much good had been derived from the friendly interchange of ideas and that developments of great importance to the cotton industry of the world would result by continuing the work.

At the Bremen congress of the International Federation of Europe held last year the suggestion to hold a second conference was talked over informally and in April the presidents of the American Manufacturers and Growing Association met in New York and issued invitations to all the prominent cotton associations, cotton exchanges and the general public who were interested, to attend this Atlanta meeting. The visit of representatives of the cotton growing association to the Vienna congress of this year was instrumental in creating a wider interest, as a result, and we are honored now by the presence of over 100 spinners representing approximately 70,000,000 spindles, and coming from nearly every country in Europe.

TO DEMONSTRATE RESOURCES.

One important object which those of us who are American citizens, whether growers or spinners, have in view, is to demonstrate to our European friends who consume two-thirds of the crop, the wonderful resources yet undeveloped in the southern states for the production of the raw material. We want them to see for themselves that they need have no anxiety about their future supplies and that, if a fair and remunerative price is paid, America will grow all the cotton that the world needs; on the other hand, it is desirable for the growers by personal contact with the spinners to realize, that if they are to maintain their supremacy, there must be a forward movement in the direction of the removal of so-called abuses that now exist in the growing, handling and marketing of their product.

A closer union between growers and spinners is not antagonistic in my judgment to the legitimate merchant or middleman, who serves any useful purpose, but the grower and spinner are equally interested in the reformation or abolition of methods employed by middlemen, which are wasteful and therefore injured. The planter should recognize that if he wants to sell direct to the spinners he must in some way do the work of the middleman and have the same financial responsibility; he must grade, carry and finance the cotton as the merchant now does. The crop should be transferred from the plantation to the factory with the least possible expense, so that grower and spinner may share the economies thus effected.

The spinner comes here to inform the grower regarding the merit and value of cotton of even running staple and grade which has been carefully picked and ginned, and to explain his willingness to pay a premium for such cotton; a premium which will more than pay for the extra cost of

production and for the improved machinery which may be necessary.

As regards packing, it is idle to waste words in condemning the present system. All admit that the time has now come for definite suggestion and prompt action to effect needed reforms; this cannot be accomplished in one week or one year, but by gradual and steady progress. To this end we should discuss gin compressing, which would effect an enormous saving in transportation and insurance and enable the overburdened railroads to move more expeditiously the ever increasing crop. Our foreign friends are prepared to show us how cotton from the new African fields is being packed, and to urge the adoption of a similar system here.

The proper marking of cotton should be insisted upon. This can be brought about if spinners demand it as a condition when purchasing. If this conference can suggest and secure the adoption of an efficient system of marking bales a great deal will have been done to remove loss, friction and trouble.

In relation further to transportation, the cotton world needs a uniform bill of lading, which states authenticated facts regarding shipment, and affords adequate protection to the owners of the cotton, and the banks that help them to finance the crop.

Equitable tare and how to make it for the interest of the grower to bale cotton right are also important topics. In my opinion cotton should be bought on net weight, but in addition spinners should pledge themselves to pay an adequate price for the bagging and bands when put on according to a required standard.

EXCHANGE CONTRACTS.

We welcome to this conference representatives of the leading cotton exchanges of Europe and America, and with their assistance we desire to discuss cotton exchange contracts and their effect upon the growing and spinning industries. This principle should be established: that any practice which is opposed to the development of the world-wide cotton industry on a sound economic basis should be corrected or done away with.

As regards trading in futures, and speculation resulting therefrom, there is widespread difference of opinion. Many growers and spinners believe that only a small part of the trading is for hedging purposes, and that most of it is closely allied to gambling, and, therefore, highly objectionable. Able and honest merchants on the exchange defend the present system as essential to the welfare of the industry and retaliate by saying that spinners are speculators when they sell goods without owning cotton, or own cotton without selling goods. This vital question should, therefore, be discussed with the utmost fairness and frankness, and an endeavor made to arrive at the truth. If speculation is hurtful to the industry there should at least be devised some method of restraining it and rendering it more difficult and less extreme in its character.

The cotton growing associations propose to reduce speculation by building warehouses and marketing the crop slowly through the year. The international federation has suggested holding a reserve stock which can be sold on the market when prices are soaring too high. Both of these schemes are meritorious if carried out on sound business and economic lines.

I am heartily in sympathy with the report recently issued by a committee of the New York cotton exchange on the certification of cotton in southern warehouses, and improved classification as to grade and staple. This would, in my opinion, tend to control speculation, and at the same time make the New York contract more serviceable to spinners both as a hedge and for actual consumption.

GOVERNMENT REPORTS.

To what extent government reports and statistics are helpful or injurious, and how they can be made more useful, are also questions of great interest, which are on the program for debate.

Perhaps the most important thing that this conference can accomplish is to perpetuate its own existence by forming a permanent international committee of growers and spinners; it might be named the International Committee of Growers and Spinners, and be composed of one representative each of English, Continental, Northern and Southern American spinners, the Southern Cotton Association and the Farmers' Educational Union, and, in addition, a president and two vice presidents representing cotton growing, American spinning and European spinning. This committee could carry on continuous work in the direction outlined by the present conference and call together another convention at such time and place as may be considered wise. It is suggested that the committee on organization should give consideration to this subject.

We have many questions to deal with and it will be necessary to economize the time of the conference. The committee on preliminary arrangements recommends the holding of sectional meetings this afternoon and Tuesday afternoon each under the direction of a chairman and vice chairman, who will be nominated by the organization committee.

This is a notable gathering and we hope the results may be commensurate with the expenditure of time given to it by so many busy men. Let me express the hope, in closing, that frankness and courtesy will characterize all our discussions and proceedings, and that by interchange of ideas, not only in the hall of debate, but as we meet in a social way, we shall be able not only to advance the cotton industry, but to cement more closely the brotherhood of men and of nations.

The delegates were then welcomed by Gov. Hoke Smith, the Mayor of Atlanta and the President of the Atlanta Chamber of Commerce. The governor's address was as follows:

Gov. Smith's Address.

Mr. President and Gentlemen of the International Spinners' Association: We welcome you to the centre of the cotton growing belt of the United States. We are sure that nothing but good can come from closer relations between cotton spinners and cotton growers. This section raises 70

per cent. of the lint cotton that goes to your mills. You could not have prospered without our cotton. Our cotton growers would have had no market had not your mills prepared the lint cotton for practical use.

We desire you to know our cotton section. In no way can you understand it so fully as by traveling through it, investigating as you go.

The states properly classed as cotton states cover over seven hundred and fifty thousand square miles, with a soil capable of producing every variety of foodstuff. While inhabited by only twenty millions of people they could support a population as dense as that of Holland. If settled as thickly as the United Kingdom the population of the cotton states would be over three hundred millions.

Less than one-fifth of the land is in cultivation and not more than one-half of that in cultivation is in cotton. More than half of the land of this cotton section is adapted to the culture of cotton.

THIS THE FAVORED SECTION.

We ask your attention to our claim that while cotton may be grown with partial success in many countries of the world, yet nature has intended this to be the favored section for the growth of cotton in its perfection. This is not due to a better knowledge with reference to the culture possessed here, but to a combination of soil and climatic conditions that exist nowhere else.

With us only second in importance to temperature is the distribution of rainfall among the seasons suited regularly to cotton culture. We have two dry and two wet seasons each year and then a frost that kills the plant and insures a silky, fine staple.

The increased production and use of lint cotton in this section has no parallel. A century ago we exported thirty-six thousand bales. Thirty-five years ago 4,474,000 met the demands of the market. Last year 13,500,000 was none too much for the mills of the world.

Last year European mills alone took over 7,500,000 bales of southern cotton.

This section has produced the lint cotton and your machinery has made the finished product leave far behind all fabrics made from cotton's three rivals—wool, flax and silk.

While the use of cotton has been increasing so rapidly throughout the world in spite of the increasing price, the world's wool production decreased from 1895 to 1905 40 per cent. During the same period the world's consumption of lint cotton increased 70 per cent.

The future demand for cotton manufactured goods should increase even more rapidly. Modern civilization is advancing through the open gates of Asia, and the isles of the sea. Cotton growers and cotton spinners may join hands to clothe the world. You have a common destiny.

INVESTIGATE CAPACITY.

You can rely with confidence upon our cotton belt to furnish a supply as a permanent proposition to meet your ever increasing demand. We invite you to investigate the capacity of this section to furnish cotton and to cease troubling yourselves about cotton fields in other countries yet to be found. The cotton states are here opening their gates for your inspection. While the crop this year is conceded to be less than the crop of last year, the only question about the quantity offered you during a period of years will be the price you are ready to pay for it. Careful study through scientific schools is now being given to agriculture in this section.

The lands already in cotton can be made to double their yield and only a limited portion of those capable of cotton production have been yet broken by the plow. But the scientific study of agriculture here has taught that our soil and climate can produce many other crops remunerative to the planter besides cotton, and cotton culture is not the necessity that it was in years gone by. The tendency is toward diversified crops, lessening the dependence upon cotton culture.

It costs more to raise cotton than it did a few years ago. Lands have increased in value, and labor, fertilizers and supplies of all kinds used by the farmers have increased in cost. A low price one year will mean less cotton next year. A good, steady, profitable price will mean steady increase of production until by the efforts of the cotton planters and the cotton spinners, the clothing of the world can be made from cotton goods.

The cotton planters of this section for a number of years sold their cotton at starvation prices. They are gratified to know that a tendency toward more reasonable prices has not lessened the extension of the sale of cotton fabrics. The value of exports of cotton piece goods from Great Britain in 1906 was $366,908,200, an increase over 1905 of $22,277,300.

Cotton was relatively higher last year as compared to former years, yet last year was probably the most lucrative year the spinners ever had. The cotton planters must know just what cotton you need. They can grow it for you, but they cannot be expected to grow an excessive crop and have their increased labor rewarded by less pay for a large crop than a small crop would have brought.

WHAT VISIT MEANS.

Your visit brings the cotton field and the cotton mill close together. It means closer relations and in time direct trade from the railroad station in the cotton field to the cotton mill.

The cotton growers have learned that they cannot expect to unload their entire crop upon you as soon as it is gathered. They are rapidly becoming able to sell their cotton through the year. They desire an equal voice with the buyer in fixing the price.

Your visit will give the cotton grower a better conception of how he must prepare his cotton to save waste and meet your needs. This will produce an economic result beneficial both to the grower and the spinner. We invite you to study our section and to give your freest opinions about what you find and what you want. You will be met with the same cordial spirit. We wish cordial relations and a thorough acquaintance between the men who grow and the men who manufacture the

world's greatest staple. And when your time is not occupied with the study of business questions we welcome you most heartily to our homes and to our social customs. We thank you for coming. We greet you most cordially. The longer you may stay, the more pleasure you will give.

The address in reply to Gov. Smith was made by C. W. Macara, of Manchester, Eng., President of the European Cotton Federation. He said:

Mr. Macara's Address.

The position I have had the honor to occupy for many years in connection with the English Federation of Master Cotton Spinners, and, during recent years, in connection with the International Federation of Master Cotton Spinners' and Manufacturers' Associations, has rendered it necessary for me, in conjunction with my colleagues on the committees of these two organizations, to devote much careful attention to the solution of many difficult problems as they have arisen in connection with the carrying on of the cotton industry as a whole. The results accomplished have been most encouraging; and a perusal of the reports of the four International Cotton Congresses, which were held successively in Switzerland, England, Germany, and Austria, will show what the International movement has effected. I venture to express the opinion that no commercial movement in the past has commanded, in so short a time, so much attention in Government circles. The possibilities of commercial energy, enterprise, and organization, aided by the support of the Governments of the countries interested, are unlimited. The Report of the Fourth International Cotton Congress is just issued both in America and Europe. A copy of this highly-interesting document has been provided for each delegate to this unique Convention of Cotton Planters and Spinners, and will, I hope, materially facilitate the discussion of the numerous important subjects which are to be dealt with. Such being the case, it is unnecessary for me to enlarge on these subjects.

The International Cotton Federation was formed to further the welfare of a world's industry, and includes within the scope of its operations everything in which interests common to all are involved. An organization with such aims cannot be successfully carried on except by working on the broadest lines, and with due regard to the legitimate interests of all who are engaged in the industry, whether they be the growers of the raw material, the legitimate middlemen who are responsible for the distribution of that raw material, the spinners, the manufacturers, or of any other interests that are dependent upon them.

All these are entitled to a fair remuneration for their labor and enterprise, and anything that interferes with the smooth working of an industry that concerns the welfare of millions of people ought to be energetically dealt with by united action and removed.

Those I have just enumerated are necessary factors in the conduct of this great industry; but there are, unfortunately, people who are not engaged in any of these departments who are using the raw material of a world's industry as a counter for gambling operations.

Simultaneously with the Second International Cotton Congress, which was held in England in May, 1905, there met in Rome, at the invitation of the King of Italy, an International Congress of the representatives of many nations delegated by their Governments to discuss a scheme for bringing the agricultural interests of the world into line. The idea was conceived by Mr. David Lubin, an American citizen, who succeeded in getting the energetic and far-seeing King of Italy to take the initiative in a movement the success of which is, I think, now practically assured. The International Cotton Federation, which is kindred in its aims, has cordially co-operated in this movement. In the light of what has been achieved, there is a fixed conviction in the minds of all who have taken part in the work that it is by international combination alone that the interests of any world-wide industry can be adequately safeguarded.

The first practical work of the International Cotton Federation was to endeavor to secure thoroughly reliable statistics of the annual consumption of the raw material and stocks in the hands of spinners at the middle and end of each cotton season, and as there are already returns obtained from the owners of about 100,000,000 spindles, it is expected that it will not be long ere a complete return from all the spindles in the world will be available. The International Institute of Agriculture has similar aims in view as regards furnishing reliable statistics of the supply of agricultural products, including, of course, cotton. When these two sets of statistics are available it is obvious that the work of the outside manipulator of prices will be rendered extremely difficult, if not impossible.

The American cotton crop plays such an important part in the supply of the world's needs, that operations which affect it practically affect, more or less, the entire cotton crop of the world, and when consideration is given to the colossal dimensions of the world's cotton crop, and to the fact that the raising of the annual average price by illegitimate speculation by even one cent per pound represents £18,000,000 ($90,000,000), it must be obvious that it is time that some determined effort was made to rid the industry of this serious and unnecessary burden.

It is impossible to imagine any more important work, or one in which growers and spinners can more readily join hands, as it is inimical to the interests of both that such colossal sums should be extracted by those who neither grow cotton nor manufacture it, nor, indeed, render any actual service in the distribution of the raw material or its manufactured products.

Cotton planters have been urged from time to time to hold for extreme prices, but it is doubtful if the adoption of such advice would in the long run be to their advantage. It must never be lost sight of by the growers that this staple supplies the clothing for the poorest people of the world in every country, and that applies more particularly to the 700,000,000 in India and China, to whom a great rise in price certainly means a limitation of their purchasing power, with a consequently reduced employment for the spinners and

manufacturers of the world, upon whom the growers of cotton are dependent. It has been the aim of all engaged in the manufacturing of cotton for many years to reduce the cost of production by taking full advantage of science and invention, and great economies have been effected. I think it would be well if this example were followed by the growers of our raw material.

In addition to the saving which might be effected by the suppression of outside manipulation, very great economies might also be effected in the cost of growing, handling, and marketing cotton, as is made evident in the Report issued by the Lancashire Private Cotton Investigation Commission, which will be found in the appendix of the Report of the Fourth International Cotton Congress.

The great majority of people who are engaged in the growing of cotton and its manufacture are too much occupied with the concerns of their own businesses to have followed the enormous development of the cotton industry. Thirty years ago the total crop of the United States was only about 4,500,000 bales. Now America herself is using annually 5,000,000 bales out of a crop of 13,500,000. The crops of the other cotton growing countries have also increased largely, and all this cotton has gone into consumption.

With the spread of civilization, coupled with the success of the efforts which are now being made to reduce the possibilities of war, it is not, I think, taking too sanguine a view to assume that the progress of the next thirty years will be in a much greater ratio than that of the past thirty years. With such prospects before us, it is essential that we should encourage, in every way, the enterprise of all who are endeavoring to make provision for the ever-increasing demand for the raw material of an industry that plays so important a part in the clothing of the people of the world.

Great efforts have been made during recent years to develop cotton growing in the Colonies and Dependencies of European nations, and many enthusiastic views are expressed with regard to the progress that will be made in these new countries. Although I am of opinion that the experience of America in the early years of the cotton growing industry will probably be repeated, and that the progress will be slow, there is little doubt that any attempt on the part of the American growers to maintain prices at an abnormally high level will have the effect of giving an increased stimulus to these efforts, and progress may consequently be much more rapid than under normal conditions.

What is equally important, however, in the interests of the cotton industry as a whole, is that prices of the raw material should not be reduced to a level which will not adequately remunerate the growers. We shall certainly have, as in the past, bad seasons alternating with good, but as cotton, unlike most other agricultural produce, can be stored for years without deterioration, it would surely be wise and prudent, in times of over abundance, to establish a reserve for years of partial failure, which would also have a steadying effect on prices.

In conclusion I should like to emphasize that, taking into consideration the magnitude of the interests involved, the risks to which the cotton plant is exposed, and the prospect of the continued development of the world's cotton industry, we should be short-sighted indeed if we did not take energetic measures to increase our present supply of the raw material, to broaden the basis of that supply, and likewise give attention to the establishment of a reserve in years of abundance as an insurance against years of partial failure, and all the suffering which this entails. I quite appreciate the great difficulties which surround this last suggestion, but when difficulties are resolutely faced it is wonderful how they can be overcome.

Important as are the objects of this Convention which has brought the men of so many nationalities together, it is even more important as affording another demonstration of how much the interests of all nations are bound up together. The more fully this can be realized, the greater will be the success of the efforts which are happily being put forth by exalted personages, and the governments of the world, to remove international jealousies, to settle international disputes by arbitration, and to promote peace and goodwill among men.

Wm. D. Hartshorne made a very appropriate response to the addresses of welcome, after which the following permanent officers of the conference were elected:

President, James R. MacColl, Providence, R. I.
Vice Presidents, Harvie Jordan, of Atlanta; W. D. Hartshorne, Lawrence, Mass.; C. W. Macara, Manchester, England; C. S. Barrett, Atwater, Ga.; S. B. Turner, Charlotte, N. C.
Secretaries, Arno Schmidt, Manchester, England; William H. Woods, Natchez, Miss.; C. J. H. Woodbury, Boston, Mass.; R. H. McCullough, Arkansas; C. B. Bryant, Charlotte, N. C.

It was then decided to assign the discussion of the subjects before the conference to various committees, whose sessions were public. The meetings were held in the committee rooms of the Capitol, where the questions were earnestly discussed in detail. It was evident at these meetings that both planters and spinners were learning a great many things about the cotton industry and it was surprising in view of the sharp conflict of opinion heretofore existing, how quickly agreements on disputed points were reached when the disputants met face to face.

Among the most interesting subjects were those relating to more direct relations between planter and spinner, dealing in futures, and speculation. In the discussion of these questions the representatives of the New York Cotton Exchange took an active part and did much to dispel many misapprehensions on the part of the planters. They showed plainly a disposition to meet the planters and spinners half way in bringing

about a reform of existing abuses, and did much toward convincing all present that the cotton exchange is an essential part of the cotton trade and that its managers are as progressive as either the planters or spinners.

In the discussion before the conference D. A. Tompkins, of Charlotte, N. C., made the following address:

Mr. Tompkin's Address.

Mr. President: The cotton trade is made up of three sections, the production of cotton, the commerce in cotton, and the manufacture of cotton. If either of these two join together to try to destroy the other it will be the old story of the stomach and the members; they will destroy themselves at the same time. This convention ought not to foster the idea that the cotton merchant, if you call him the middleman, ought to be put out of business. You will never put him out of business until you end the business of the cotton trade. (Applause.) The conference ought to devote its time and energy to the correction of abuses in each one of the three departments of production, commerce and manufacture. ("Hear, hear!" from Mr. Macara.) When you have eliminated the faults of each of those I am one who believes that the price will regulate itself to the advantage of all three ("Hear, hear!") and to the advantage of the people of the world who want to be clothed. When the producer water-packs a bale he is committing a fault as great as the exchanges are committing in their gambling. That is what you want to give your attention to correcting. And while I compliment the farmer and rejoice that he is having a time of prosperity, I do beseech him not to conceive that he is the whole business. When the spinner conceives that he can control the merchant and the producer too, the end of the spinner is pretty nearly at hand.

Now it is important that we do not let the popularity of a phase of this subject take possession of us. As I believe that the faults of the producers, the spinners and the manufacturers should be rather the things that we direct ourselves against than fighting each other so I believe that legitimate exchanges, with the faults eliminated are a part of the commerce of the country and that we ought not to antagonize the exchange properly conducted and properly regulated ("Hear, hear!" and applause). I do believe that a cotton exchange ought to have cotton and not chips and I am with these gentlemen who propose that the gambling element in the exchanges ought to be eliminated even if we have to put the whole exchange business out of business and start over anew and organize new exchanges. ("Hear, hear!") But it would not be reasonable that we should mislead ourselves by supposing that the producer of cotton can sell his cotton direct to a spinner. The merchant is as useful there as anywhere else in the world and the exchange is as useful, legitimately conducted, with gambling features taken out, to help in this world's commerce as in other mercantile businesses. A spinner wants one kind of cotton, the producer makes several kinds of cotton; the merchant must of necessity aggregate the cotton, differentiate it into the different kinds of cotton that the spinners want, and sell it to them. I would not put one word of reproach against the merchant who does that, but I would regard him as important in the cotton trade as the producer or as the spinner.

Now let us not forget what we are here for; namely, to participate in a conference for our mutual advantage. (Hear, hear!) Let us devote ourselves to the elimination of the faults of all three departments of the cotton trade, and not to the exciting of prejudice of one against the other. It is a few years ago that you farmers were after the scalps of the cotton spinners, of whom I am one. Today you have nobody and I am delighted that you have nobody who so thinks, but you thought that the cotton spinner was trying to buy your cotton for nothing. We would rather have a fair, profitable, stable price ten to one than the fluctuating price we have had in the past. None is more delighted than I am that the farmer has got to that point where he can hold his cotton and market it gradually and that he will go into the business of developing a warehouse system by which cotton certificates may be bought in Bremen and Liverpool with safety and on grades, and if we can develop systems of that sort to help the commerce instead of trying to hurt the commerce out of business, we will be forwarding your interests as a grower, Mr. Grower, and yours as a merchant, Mr. Merchant, and yours as a manufacturer, Mr. Manufacturer. I thank you, gentlemen, for your courtesy. (Applause.)

Congressman Heflin, of Alabama, made the following very interesting address:

Hon. J. Thomas Heflin's Address.

Mr. Chairman and Gentlemen of the Convention:

I represent, as a delegate from the State at large, the Southern Cotton Association of Alabama. I am glad to be here today. I am glad to see this great gathering, which means so much to the section where I live and so much to the spinners here and abroad and to the consumers everywhere.

I take this opportunity offered to say a word or two about a closer relationship between the spinners and the growers. There is a great obstacle standing in the way today between those who produce the cotton and those who spin it, and that is the speculating exchange. If you could do away with the cotton gambler in this country and abroad you would remove the stumbling block, the great divide between the spinners and the growers, and you could have an understanding one with the other. But until you destroy the gambling exchange in this country and in Liverpool you cannot have this understanding that ought to exist. ("Hear! Hear!" and cheers.)

So far as the people of the South are concerned, they have seen their strength; they have realized that in organization they are strong, that unorganized they are helpless. They are being organized for the purpose, not of punishing the spinner here or abroad, but for the purpose of driv-

ing from its place of power the gambling exchange ("Hear, hear!" and cheers.) You have heard it said, haven't you, that the farmer could not organize? (Voices: "Yes.") Well, let me tell you a little story that illustrates the situation. Old Colonel Marchbanks, during the war between the States, on one occasion found a lieutenant gagged on the roadside, and he said, "What are you doing there?" The lieutenant said as best he could, "I am gagged." Said the colonel, "Who gagged you?" "Some privates," he replied. And very indignantly the colonel said, "Privates can't gag a lieutenant." He looked up and said, "By God, they did do it." (Laughter.)

And, my friends, you say that the farmers can't organize—the producers? I am here to answer you today that they did do it. (Cries of "Good!" and cheers.) And we are upon our first legs, too, in the organization. We are growing stronger day by day. The Farmers' Union and the Southern Cotton Association have joined hands about a common center for the protection of those who produce the cotton in the South. (Cheers.) They are the absolute masters of the situation. (Renewed cheers.) They are going to demand nothing that is unjust or unfair; they aim harm at no honest enterprise; they want a fair deal and a fair price, and that is all, and by the eternal gods they are going to have them. (Cheers.)

The spinners abroad do not know what we have had to contend with down here. (A voice: "No.") The exchange in New York used to send out their statements that India was producing cotton in abundance, that China would startle the world, that they have found forests over there where the trees are burdened with this white fiber that you are growing in the field. And the farmer down South heard it and believed it, and Theodore Price would say: "The world will make a bumper crop; deliver your cotton as fast as you can and sell it as fast as you get it out." Unorganized and helpless, we believed the story about cotton growing abroad. But the fact is that cotton is not making its first appearance in the old country. It grew in India three thousand years ago. The army of Xerxes wore uniforms made of cotton. Cotton nodded its white plumes along the march of Alexander the Great and his conquering army. It flourished along the Ganges where heathen mothers offered up their infant offspring to the cruel gods of a false religion. In the far-off time of the Pharaohs cotton was worn by the dark-eyed Egyptian women and was prized for its beauty and glory. The Greeks used saddle blankets made of cotton three hundred years before Christ. Wicks woven of cotton burned in the temples of the Hindoos and constituted holy pillows for the priests. Cotton is no stranger to the lands beyond the seas. It came from the old world to Jamestown with our fathers in 1607, and when cotton caught the kisses of a Southern sun and felt the balmy air of this Southern clime it refused to flourish in any land other than Dixie. (Cheers.) The cotton seed was not content until it found lodgment in Southern soil, and cotton did not assert its kingly prerogatives until a Southern sun kissed its snowy crown and bade it clothe the world.

Now we have a crowned old monarch with a lovely woman at his side, and his arm entwined about her; and written beneath them: "King Cotton and his darling Democracy send greetings to their loyal subjects: white supremacy, peace and prosperity in the South."

My friends, the gambling exchange is detrimental to the farmer, it is detrimental to the spinner. We want a fair deal; we want direct trade relations with the spinners abroad. If you will take away the commission men that we have to deal with today between cotton mills in this country and China, one of which is as high as 100 per cent., you will find that you will fare better and we will fare better.

The law as laid down by our highest court says that "Congress has exclusive control over the telegraph where it effects communication from a point in one state to points in another, because such transmission of intelligence is an essential agency of interstate commerce." The State has the right to regulate exchanges within its borders, and be it said to the credit of Georgia, Alabama and two or three other Southern States, they have decreed that bucket shops shall close. Now it is up to Congress to assist the States in putting the cotton gamblers out of business. The producer must be relieved of the outrageous and destructive competition to which he is now subjected by the speculator, who offers upon the exchange a fictitious product which he cannot and does not intend to deliver. Those gambling exchanges buy and sell a fictitious product, and the price that they fix determines the price of the entire cotton crop. This obnoxious method deprives the farmer of his right to a voice in fixing the price of this important product—a right which is accorded to other producers.

The South wants an honest market and such prices as will follow the unhampered operation of the law of supply and demand. We want to return to the principle as old as commercial intercourse itself, and that is that the seller shall be compelled in good faith to deliver the commodities sold at the time and place specified in the contract.

Suppose a man goes out and offers in exchange for $100 a horse, and he does not own the horse, he obtains money under false pretences and in my State you can put him in the penitentiary for it. Suppose he goes into the market place and gives a mortgage on a horse that he does not own and gets $100, he is guilty of a penitentiary offense and must wear stripes for his crime. And in this transaction, in a business way, only the mortgagor and mortgagee are effected; and yet Congress permits the cotton gambler to offer for sale something that he does not own and never expects to own, and which the man buying does not want, and through this evil performance the real product upon which millions of people are dependent for a livelihood is injuriously affected. (Cheers.)

Is this treatment of the world's cotton producers fair and just? Every buyer is the direct friend of the producer, for he buys and under the free exercise of the law of supply and demand hopes to see the market sustained and advanced. To have this demand for cotton met with an artificial supply is antagonistic to the interests of the cotton producer and is a crime against the great army of cotton producers in this country.

The cotton gambler is not a help, but a hindrance, to the producer. He is not a friend, but a

dangerous enemy, to the farmer. He is not a blessing, but a curse, to the South. What the producer needs is an open market—open to the world. In order to obtain this he must fight anything and everything that hinders competitive buying. He must ignore the cotton gambler's manufactured prices and put him out of business, bring the spinners to the market place and let them buy in the open.

These cotton gamblers are the trained soldiers of a warfare that has cost the South millions and millions of dollars, that has sown the horrors of debt and mortgage upon the homes and farms of our people. The Southern Cotton Association and the Farmers' Union routed these robbers last year and carried out the scriptural idea of "breaking the jaws of the wicked and plucking the spoil out of their teeth."

Cotton needs the friendship and co-operation of farmers, merchants and bankers. When cotton fares well in the market our people are prosperous and happy. Let there be no friction between the Farmers' Union and the Southern Cotton Association. These two great organizations have a common end, a common interest, and ought to wage, and are now waging, a common warfare against a common enemy.

Here stands the farmer in the market place with the world's supply of cotton, say twelve million bales, and it is worth under the law of supply and demand 12 or 15 cents. The speculator comes up and says, "I will sell it to you for 9 cents." He stands just as the devil did when he took Christ up on the mountain and showed him the territory around him which he would give him if he would fall down and worship him, and he did not own a foot of land on earth. (Cries of "Good!" and cheers.) But there is your speculator, and what is he doing? He is running the price up and down, and this great army of producers in the South are dependent upon the will of the gambler in the exchange for that which represents the strength of their soil and their labor and capital. And they come to the spinners now, not with a threat, but they merely suggest to you—and you will read it between the lines later—that if they ever catch a spinner backing a speculator they are going to make him pay for it in the market. ("Hear! Hear!" and applause.)

We want you to meet us cordially on that proposition. We want you to shake hands with us about the center of a mutual interest. We are indebted to you for presenting our cotton in the finished state to the world. There ought to be a better relation between us, and I thank God that the day has come when we can have it. Let us work together, each for the good of all and all for the good of each, who are trying to do a legitimate business; but let us put the brand of our disapproval upon the gambling exchange. (Cheers.)

My friends, I have a bill in Congress now providing for ten years' imprisonment in the penitentiary and five thousand dollars' fine for those who run a gambling exchange or carry on what is commonly called dealing in cotton futures. If I can get that bill through—

The President:—The gentleman's time has expired.

Mr. Heflin:—I ask unanimous consent for just three minutes. (Voices: "Yes;" "Go ahead;" "We will give you ten if you want.")

The chair put the question on extending the speaker's time and declared him entitled to an extention of five minutes.

Mr. Heflin:—I shall offer this resolution this afternoon before the committee, and I take this opportunity to present it to this body:

Whereas, On the plan of speculation commonly known as gambling in cotton futures, the producer and the consumer alike are deprived of any voice in fixing the price of cotton; and,

Whereas, The uncertainty that ranges around the cotton price of cotton produced by such speculation increases, causing the market to fluctuate many times a day, is antagonistic to the interest of the spinner and the consumer and is a crime against the great army of producers;

Be it resolved by the International Conference of Cotton Growers and Manufacturers in Convention assembled, That we earnestly request the Congress of the United States and the Parliament of Great Britain to regulate the Exchanges doing interstate and international business so that gambling in cotton futures shall be prohibited and so that the seller in the Exchange shall be compelled in good faith to deliver the cotton sold and the grade agreed upon at the time and place specified in the contract. (Applause.)

Now, my friends, in conclusion permit me to say: In the catalogue of commodities cotton is the master production, the most readily cashed and the most widely consumed among all the great staples of the world. Nowhere in all the earth are sunshine and shower so mingled and measured out to the cotton plant as is the case in the beautiful South. God in his wisdom and goodness has given us dominion over the cotton-producing country. To us the friendly foreigner comes for this white fiber as the rulers of old went to Solomon for wisdom; as Daniel turned to Jerusalem for light and strength, these foreign countries turn to us for the wherewithal to be clothed. Foreign gold comes in search of this white treasure of the field with all the earnestness of Sir Galahad who went in search of the Holy Grail. The attention of the world is turned to the South in the spring of the year, when the farmer prepares his soil and places seed in the ground. Sunbeams dance on the surface, refreshing showers seek and find their hiding place, and lo! germination begins. Little plants push the clods away and smile at the sun. Gentle zephyrs kiss their tender faces and breathe into them the message of their mission. We hear the music of the hoe and the song of the happy plowman. Proud and graceful the little stalks stand mantled in leaves and laden with squares. We look again and thousands of white blossoms nod welcome to the gold-belted bees. Now they are rosy-red and soon they fade and fall, leaving behing them tiny green spheres. Basking in sunshine and reveling in shower, they flourish until autumn whispers to every full grown boll, "Open secame," and the cotton stalk flings its fleecy fiber to the breeze and busy fingers pluck it from the bolls.

We hear the hum of the old cotton gin, the seed falls down on the floor below and lint comes out in swirls of snow, and yonder at the cotton factory, hard by the cotton field, we hear the tremulous voice of industry in the concert of whirling spin-

dles wooing the fiber into cloth and the finished product goes out upon the pulsating tide of a splendid commerce. Cotton is king—king of American exports, and in all its ramifications is basis for the greatest manufacturing interest of the world. (Applause and cheers.)

At the second day's session C. W. Macara, of Manchester, Eng., was the presiding officer. While waiting for the reports from the sub-committees, the discussion of closer relations between planter and spinner was continued. Many of the speakers departed from the subject and as a consequence the discussion took a wide range. The time was apportioned between the growers, spinners and representatives of the cotton exchanges. Among the speakers were Ben. L. Griffin, of the Farmers' Union, Arkansas, Mr. Buston, of the Liverpool Cotton Exchange, Arthur Kuffler, spinner, of Austria, Mark H. Thomas, planter, of Texas, William Howarth, representing the fine spinners' and doublers' association of England, E. D. Smith, of the Southern Cotton Association, Columbia, S. C., and Thomas Coates, of England. The last named speaker represented the Cotton Buying Company, Limited, of England. He stated that his company, established twenty-five years ago, had purchased during that time $150,000,000 worth of cotton and at all times had a large balance in bank for the purchase of cotton. He stated that his company was ready to purchase cotton direct whenever the planters were ready to sell.

The various reports of the sub-committees elicited warm discussion. Several times during the proceedings as many as a dozen speakers were clamoring for recognition.

At its third and last day's session, with Harvie Jordan as chairman, the cotton conference did its most important work by making the conference organization permanent. An international committee is to consist of seven members representing the Southern Cotton Association, the Farmers' Union, the Sea Island Cotton Association, the British manufacturers, the continental manufacturers and the two cotton manufacturers' associations in America. The chairman is to be some one not a member of the committee and the expenses are to be shared equally. Thus the International conference suggested at Atlantic City in September, 1905, by the editor of the Textile World Record has become a permanent institution in the world's cotton trade. The other work done at the last day's session was the passage of resolutions on the various questions before the conference.

An animated discussion of trading on cotton exchanges showed that the planters and manufacturers were agreed that reform was necessary. The sentiment among the planters was largely in favor of abolition of cotton exchanges. The foreign spinners were conservative and advised making haste slowly. They contended that a house, bad though it might be, should not be torn down before a new shelter was provided. Evils had grown up in exchanges, but they served a useful purpose by reducing the risk of trading in cotton and manufacturing goods by means of hedging. Congressman Heflin led the attack on the exchanges and made an eloquent appeal to protect the trade against illegitimate trading. After a long discussion it was decided that the conference should split up into its component parts that each association might consider the question separately. What had been one meeting immediately became five, all in one room, the Southern Cotton Association in one corner, the Farmers' Union in another, while the foreign and American spinners formed three separate groups. Votes, speeches, calls to order, the pounding of gavels, applause, and cries of disapproval formed a pandemonium for fifteen minutes, then the conference reassembled and the votes of these organizations were announced by their respective presidents, Jordan, Barrett, Macara, Hartshorne and Tanner. Four were in favor of referring the question to the various associations and this was accordingly done.

This action means more in the way of reform than a radical resolution would have meant. Both planters and spinners are united in the determination that the evils of speculation shall be abolished. They have decided to be sure they are right and then go ahead. The coming year will enable them to study the question and decide what is right and at the next conference in 1908 they will be ready to go ahead. Many at the con-

ference believed that the cotton exchanges would use the coming year for the same purpose and that seeing the handwriting on the wall they would be ready in 1908 to join hands with growers and manufacturers in reforming the system of exchange trading. The exchanges of New York, New Orleans, Liverpool and Bremen sent delegates to the conference and this was accepted as proof that the spirit of reform had penetrated the exchanges themselves.

The opinion of the conference was expressed in the following resolutions, which were passed with remarkable unanimity in view of the divergence of interests represented:

Resolved, That having considered the question of uniform classification of American cotton this committee is unanimously of opinion that standard types should be adopted either by the United States government or by an association of delegates from cotton exchanges, cotton growers and cotton spinners and that the classification should be made up on grade and color alone and not upon staple.

Resolved, That this committee having considered the question of cotton contracts is unanimously of opinion that standard contracts of 50,000 pounds net weight should be adopted in place of present custom of 100 bales; that in ascertaining the net weight, the net weight tenderable shall not exceed 1 per cent. above or below the standard weight contracted for; that actual tare, canvas and bands (bagging and ties) be allowed, and that the present 1 per cent. franchise clause be abolished.

Whereas the question of the excessive amount of damp in American cotton and the inadequate allowance for same under existing various cotton exchange rules are of serious importance to spinners, this committee is of opinion that steps should be taken by the various associations here represented with a view to remedying the evil of excessive damp and placing the question of claims as adjusted under the present rules of the exchanges on a more equitable basis.

We recommend that all planters, farmers and growers of cotton give more attention to the selection of seed for planting purposes by selecting well-matured bolls of the type of cotton desired.

On improved ginning the following recommendation is made: Every gin should be put in the best order possible for the reason that much cotton when picked is green and unmature; we recommend that all such cotton be housed in good cotton pens for at least 30 days before being ginned. It should be thoroughly dried or cured before ginning and never ginned while green or damp. Especially does this apply to staple cotton which also should not be ginned in damp weather. We further recommend that in ginning staple cotton the saws be set shallow in order that the brushes may take the cotton from the saws as fast as ginned to prevent kinks, or napping, and a smooth sample will be made.

In compressing, we condemn the bagging now in use; first, because of its rough and coarse nature it invites rough treatment; second, it does not hold the marks; third, on account of its great weight and bulk it entails heavy loss in freight. We therefore recommend the use of a light burlap or covering made of cotton such as osnaburg, 10 oz. weight per yard, 40 inches wide.

We recommend that all planters wherever practicable put in as rapidly as possible gin compresses and in baling of cotton the Egyptian character of bale be adopted, the ties to be of the Egyptian type and ten in number. The length of the bale to be 48 inches, the width 21 inches, the weight 500 pounds, the density 35 pounds, the bale to be marked upon both ends with weight, grade and staple.

Other resolutions related to country damage, marking cotton, and uniform bills of lading. The conference declined to recommend the abandonment of government reports of condition, but advised that reports of cotton ginned be issued by government as fast as received to avoid the present incentive to speculation.

After passing resolutions expressing obligations to Gov. Smith of Georgia, Harvie Jordan, the various presiding officers, secretaries Woodbury and Bryant, members of the press, and those who had opened their houses for the reception of the visitors. President MacColl expressed in a few well chosen words the general sentiment that the Atlanta conference was a great success. The Second International Conference then adjourned with the best of feeling prevailing between the representatives of the many divergent interests.

The Atlanta Cotton Conference was a great success. The benefits will follow not only from the better understanding by reason of the discussions in the full sessions and in committee, but also from the acquaintances formed between growers, spinners and cotton exchange men. All three are both learning and unlearning many things by meeting one another face to face, and are getting a better idea of the lines on which all can work for common objects. That is what the Conference was designed to accomplish.

There were 19 cotton mills in China during 1904, containing 2,250 looms and 564,650 spindles.

SPONTANEOUS COMBUSTION.

From the report of a commission appointed by the governor of New Zealand.

WOOL.

The yolk of wool is a fatty material, and contains among its constituents oleic acid, which absorbs oxygen. In a properly packed and stored bale of wool this action nearly always takes place, and is accompanied by a slight increase in weight and by the generation of a small amount of heat. This heat is nearly always concentrated near the centre of the bale, as it is here that the air has practically no access, and the non-conducting properties of the wool store up the heat. If the wool is moist, the increase of heat in the centre of the bale becomes excessive. Where large numbers of bales are stored in the hold of a ship, it is well recognized that such moisture will cause damage to the wool, even though not resulting in a temperature approaching ignition.

From a review of all the circumstances—the reports of investigations, the opinions of scientists, and the evidence which has been before your Commissioners—there is no room to doubt that spontaneous combustion does take place in wool. Numerous instances might be quoted where the interior of bales of wool has been actually on fire after being exposed to the atmosphere.

"Greasy Wool."—The evidence as to the possibility of even burning greasy wool by the application of extraneous fire has been most conflicting, and, taking the evidence of those who have spent almost a lifetime in the wool trade, the weight of evidence is against the theory of spontaneous ignition of greasy wool. The absence of evidence, however, does not negative the theory, and, given the necessary conditions, we are of opinion that spontaneous combustion is possible in greasy wool; but, has it been the cause of any of the fires which have recently occurred? The total shipment of wool from the colony for the year ending the 30th September, 1906, amounted to 415,643 bales. Of this—on the ratio of the preceding year—82 per cent. or thereabouts was greasy wool, 16.82 per cent. of scoured and sliped wool, and 1.18 per cent. of washed wool, so that greasy wool has had ample opportunity to demonstrate its possession of any inherent vice and likelihood of being dangerous under abnormal conditions. Excessive moisture, or moisture above that which is absorbed by wool in its natural state, is necessary to bring about the action of bacteria in generating heat in wool when baled and dumped under pressure. The season of 1906 being exceedingly damp had the conditions necessary to bring about the action of such bacteria. The wool season of 1906 was an exceptionally wet one, and the possibility of there being more moisture present in the greasy wool shipped from the colony during that season has been in evidence before your Commissioners. Mr. Walter Hill, a wool buyer and exporter of considerable experience and well-known ability as a wool expert, in the course of his evidence stated that there had been a bigger percentage of damp wool in 1906, taking New Zealand all around, and that he though that the sheep had been shorn before the wool was in a fit condition to shear, in order to catch the sales. Subsequently the witness transmitted to the Commissioners a list of lots of wool which he had during the season 1905-6 specially noted in the catalogues of sales which he had attended as being "wet," and had consequently avoided them for shipping purposes, considering they were not in a fit condition. These lots comprised lines of wool offered at auction in the four centres of the colony, and might be taken as a fair sample of greasy wool containing, in the opinion of an expert, an undue percentage of moisture. Each of the lots mentioned has been traced, and it will be seen from the correspondence that in no case was such wool the cause of any of the outbreaks of fire which have occurred. Indeed, only one line was aboard any of the vessels which took fire, and that lot was not damaged even by fire or water.

Considerable evidence was submitted to support the contention that sheep were frequently shorn in a wet condition, although few particular instances could be cited where this had actually taken place. One witness in the course of his evidence handed in two letters which he had, three years previously, received from two shearers who had com-

plained to him that they were compelled to shear wet sheep. The wool therein referred to as having been shorn when the sheep were wet has been traced to its destination, and it will be observed from the copies of the correspondence that the wool arrived at its destination in good condition, realized full-times prices, and was not the cause of any damage to itself or ship or cargo.

Coming now to a review of the circumstances surrounding the fires which have most recently occurred upon vessels carrying wool cargoes from New Zealand, it has been fortunate that a closer investigation into the probable cause of the fires was made in the case of the "Gothic," "Waimate," and "Rimutaka" than had been in previous cases. It is, however, to be regretted that, having gone so far in their investigations, the authorities in London, who might be expected to have instituted a searching investigation, did not make such a complete inquiry as was hoped at the outset. It appears to have been left to the shipping companies to move in the matter of ascertaining the probable cause of the outbreaks. However, with the assistance of the High Commissioner for the colony in London your Commissioners have been furnished with such data as were available at that end, and it has been of considerable assistance to your Commissioners in arriving at a solution of the problem set before them.

The Produce Commissioner in Great Britain, in the course of a report to the High Commissioner on the more recent outbreaks, said, "In each case the trouble arose in connection with wool-cargo, and it is safe to say that the cause of all the fires was spontaneous combustion in the wool. Although it is known that the past season in New Zealand was an exceptionally wet one, thus possibly tending to the baling and shipping of damp wool, the present extraordinary series of fires has led the opinion to gain ground that other causes than dampness are responsible for the trouble. In the search for the originating centres of the various fires, sliped wool has been very much in evidence; that from one company in the colony in particular. The theory has been broached that possibly a new method of treating the skins—i. e., the use of a depilatory agent—may have caused some chemical residue to be left in the wool which has led to the combustion. The action of some new sheep-dip is another theory of somewhat similar nature. Samples of wool taken from the ignited bales at the seat of the fire on the 'Gothic' have been secured by the Shaw, Savill, and Albion Company, and submitted for analysis to a specialist."

In the course of a report by the Salvage Association of London on the fire which occurred on the "Gothic" the following passage occurs: "When the discharge at first commenced we noticed that two bales . . . which had been carried on deck after the fire in No. 4 were still smouldering at the time they were discharged. We lowered these into the water to extinguish the fire, and afterwards opened them, and found that the interior of the bales was badly burned, the wool being charred to a cinder, while the exterior, with the exception of a small hole which had formed an outlet for the fire, had retained its original appearance."

Fleece Wool.—The evidence shows that there is no risk from fire from fleece wool if free from any but its natural moisture. An excess of moisture over such natural conditions is, however, dangerous. This excess of moisture may arise from various causes, such as wool baled from sheep shorn wet, moisture gained in transit during wet weather when the sheeting is faulty, shipment during rain, and loading through the surf.

Your Commissioners are of opinion that although there may be some shearing of wet sheep, yet this does not happen to any great extent, and there is no proof that it is the cause of any of the fires brought under our notice. The experiments conducted by Mr. Burridge, in which 18 to 25 per cent. of water was added, convince your Commissioners that where in the case of wet shearing the question in dispute between the station management and shearers is whether or not the sheep are in a proper condition for shearing, the additional unnatural moisture can be present only in a very small degree. This leads your Commissioners to an unhesitating conclusion that it is unlikely that fires have been due to this cause. We are also of opinion that the railway department and

those concerned with shipping exercise great care, and no case of fire has been shown to the Commission arising from their neglect. Shippers are on the alert to get clean receipts.

Locks, Pieces, etc.—In respect of locks, your Commissioners consider that there is danger of fire taking place spontaneously by reason of the vegetable matter which is frequently left therein and generates heat. Most of this class of wool is treated locally, but a considerable quantity is exported, and in our opinion this exportation constitutes an element of danger.

Slipe Wool.—In each case of fire where the cause has been traced, it has been in fellmongered wool, but in the lower sort only—viz., skin-pieces—and this is fully supported by a recent fire in a colonial fellmongery. We do not hesitate in stating our opinion that this class of wool is largely responsible for the frequent fires that take place on wool-laden ships and in fellmongeries.

FALSE PACKING.

It has come to the knowledge of the Commission that cases of wilful false packing have been discovered, and it is to be regretted that no action has been taken against the perpetrators. Evidence has been given of the packing of low-class wool of dangerous conditions inside a bale containing wool of a superior class.

SKINS.

Although no fire has been traced directly to this class of shipment, your Commissioners think that there is undoubted danger, unless the skins are properly prepared for packing and shipment.

DIPS.

We have had no evidence to show that any of the dips in use in the colony can be traced directly or indirectly as the cause of fires on wool-ships, and we do not hesitate to free them from any responsibility therefor. This conclusion is confirmed by the investigation of the Government's departmental experts.

EXTRANEOUS CAUSES.

Your Commissioners have no hesitation in stating that in many cases the fires on ships carrying wool, flax, and tow have arisen from extraneous causes. Men are still allowed to go into the holds of ships with pipes and matches in their clothing. What more likely than that matches should get astray in the hold, and, after being some time in the confinement of the hold, take fire by reason of friction, and thus originate a fire in a temperature and under conditions specially ready to produce the same? Ventilators may indirectly be an extraneous cause of fire by reason of matches being thrown down same, or by reason of sparks from the funnel or gallery being blown down.

EXPERIMENTS.

Your Commissioners have made experiments with various classes of wool under many conditions of moisture, and the results have been negative so far as spontaneous combustion is concerned. We have also experimented with flax, but with the same result. The temperature has increased, but only to a degree far below the point of ignition, and has then receded; and in case of flax, the only difference has been the rotting of the flax. We have just to hand a cable stating that the wool sent home by us—a portion of that which had been under experiment by us—has arrived there in normal condition. The experiments conducted here have proved nothing in respect to the spontaneous combustion of wool, flax, or tow.

INVENTIONS AND APPLIANCES.

We have had submitted to us many inventions and appliances for detecting excessive moisture in wool, flax, and tow, and for registering temperature in holds. Most of these have distinct merit, and some of them are well worthy of earnest consideration. While recommending the subject for investigation by the Government, we do not consider it as coming within the scope of the Commission to make any recommendation thereon.

RECOMMENDATIONS.

As the result of our examination and inquiry, your Commissioners desire to confirm in every respect the conclusions arrived at and the recommendations made in our interim report, and to add the following:—

1. That it be compulsory on shippers to

have the nature or class of their wool clearly marked on the outside of each bale.

2. That sheep-skins should be inspected under the same conditions as wool.

3. That tow should be inspected under the same conditions as wool.

4. That flax and tow should be covered, and if possible with a material less inflammable than hessian.

5. That wool should not be stowed with oil, fat, tallow, tow, or flax, or in contact with packages containing any of these products, or in contact with any other material more readily combustible than wool itself.

6. That in our opinion every ship carrying a cago wholly or partly composed of wool, flax, tow, or other combustible material should be fitted with an adequate chemical fire-extinguishing system.

SPINDLE SPEED AND TWIST ON RING FRAMES.

BY BOLSTER.

Owing to the high speed at which ring frame spindles are run, and the tendency of the band to stretch and slip, it is impossible to calculate with absolute accuracy the number of turns of twist per inch introduced into the yarn. The action of the traveler also influences the twist. Some spinners obtain the ratio between the cylinder and spindles by marking the bobbins on about 10 spindles having bands in good condition and of approximately uniform tension. The cylinder is then turned a number of revolutions and the number of turns of each spindle is noted for each revolution of the cylinder. If, for example, one spindle makes 77.5 revolutions while the cylinder is revolved 10 times, the ratio would be 7.75. An allowance of 5 per cent. for slippage is sometimes made.

The ratio may also be obtained from the speeds of cylinder and spindle as determined by a speed indicator; in this case no allowance for slippage need be made. Suppose that the speed of a spinning frame cylinder is 1,000 r. p. m. and the speeds of six spindles are as follows: 8,265, 8,245, 8,270, 8,240, 8,250, 8,230. Adding these spindle speeds together we obtain 49,500 total revolutions for the six spindles. Dividing by the number of spindles (6) the average spindle speed per minute is found to be (49,500 ÷ 6) 8,250 r. p. m. This divided by the speed of the cylinder gives a ratio of 8.25 or 8 1/4 revolutions of the spindle to one of the cylinder.

Builders of spinning frames usually publish tables giving ratios for various sizes of cylinders and whirls. These tables sometimes differ from each other although representing the same size of cylinder and whirl. This difference may be due either to the

GUESTS OF THE TEXTILE FINISHING CO., AT THEIR ANNNAL OUTING

method of calculating the ratio or to the shape of the spindle whirl. Some whirls are made with narrow, deep grooves, while others are shallow and broad. In the first case the bands grip the sides of the groove instead of resting on the bottom as would be the case with a shallow whirl. Some spinners add the diameter of the band to the diameter of the whirl and then make a straight calculation, while others adopt the following method when no ratio is available: Add the diameter of the band to the diameter of the whirl and also the diameter of the cylinder; then calculate with the diameters thus obtained.

Ex. If a spinning frame cylinder is 7 inches in diameter and makes 1,000 r. p. m., find the speed of the spindle having a 3/4 inch whirl and using a spindle band 1/8 inch in diameter.

$7 + \frac{1}{8} = 7\frac{1}{8}$

$\frac{3}{4} + \frac{1}{8} = \frac{7}{8}$

$(1{,}000 \times 7\frac{1}{8}) \div \frac{7}{8} = 8{,}143$, r. p. m., speed of spindles. In this case the ratio would be 8.14.

The following table of ratios is given for comparison and in each case a cylinder 7 inches in diameter is used.

Make of Machine	7/8 inch whirl	13/16 inch whirl	3/4 inch whirl
Fales & Jenks	7.19	7.68	8.24
Saco & Pettee	7.25	7.75	8.25
Howard & Bullough	7.12	7.6	8.14
Whitin Machine Co.	7.25	7.68	8.33
Mason Machine Co.	7.00	7.75	8.12
Lowell Machine Shop	7.05	7.58	8.12

In the spinning of a cotton yarn there is a point to which twist can be introduced with a consequent increase of strength; on the other hand the introduction of twist beyond this point decreases the strength and elasticity of the yarn. Warp yarn needs both strength and elasticity on account of the strain during weaving, while filling and hosiery yarn should be soft and pliable. Uniformity or evenness is a desirable feature in all yarn. To regulate the turns per inch a standard is adopted for different classes of yarn according to their requirements. The standard twist in American mills is as follows:

Warp twist = square root of counts × 4.75.

Filling twist = square root of counts × 3.25.

When long cotton is used less twist can often be introduced to advantage. The constant for warp twist may range from 3.75 to 4.75, and the constant for filling from 3 to 3.5. The constant for hosiery yarn varies from 2.5 to 3. For example, the standard turns per inch for a 49s warp yarn would be $7 \times 4.75 = 33.25$; and for 49s filling yarn, $7 \times 3.25 = 22.75$ turns per inch.

AT SQUANTUM, SEPT. 21, 1907. (SEE REFERENCE ON PAGE 208).

TEXTILE EXHIBITORS' ASSOCIATION NOW A PERMANENT ORGANIZATION.

In response to an invitation sent out to the machinery and supply manufacturers a number assembled at Washington during the meeting of the National Association of Cotton Manufacturers and took steps to form a permanent organization. After some discussion in favor of the enterprise it was voted to make the organization permanent. The following is a list of officers elected:

President, George Otis Draper, Draper Company, Hopedale, Mass.

Vice President, F. H. Bishop, Universal Winding Co., Boston.

Executive Board: Harry Butterworth, H. W. Butterworth & Sons, Philadelphia; E. F. Hathaway, American Warp Drawing Mch. Co., Boston; E. M. Savercool, of S. F. Bowser Co., Boston; Meldon H. Merrill, Westinghouse Electric & Manufacturing Company, Boston.

The organization started with 35 members with bright promises for a speedy and steady growth. The position of secretary and treasurer was left to be filled by the Executive Board as soon as a suitable and capable person was available, and all matters pertaining to the coming exhibition were left with that committee for their attention.

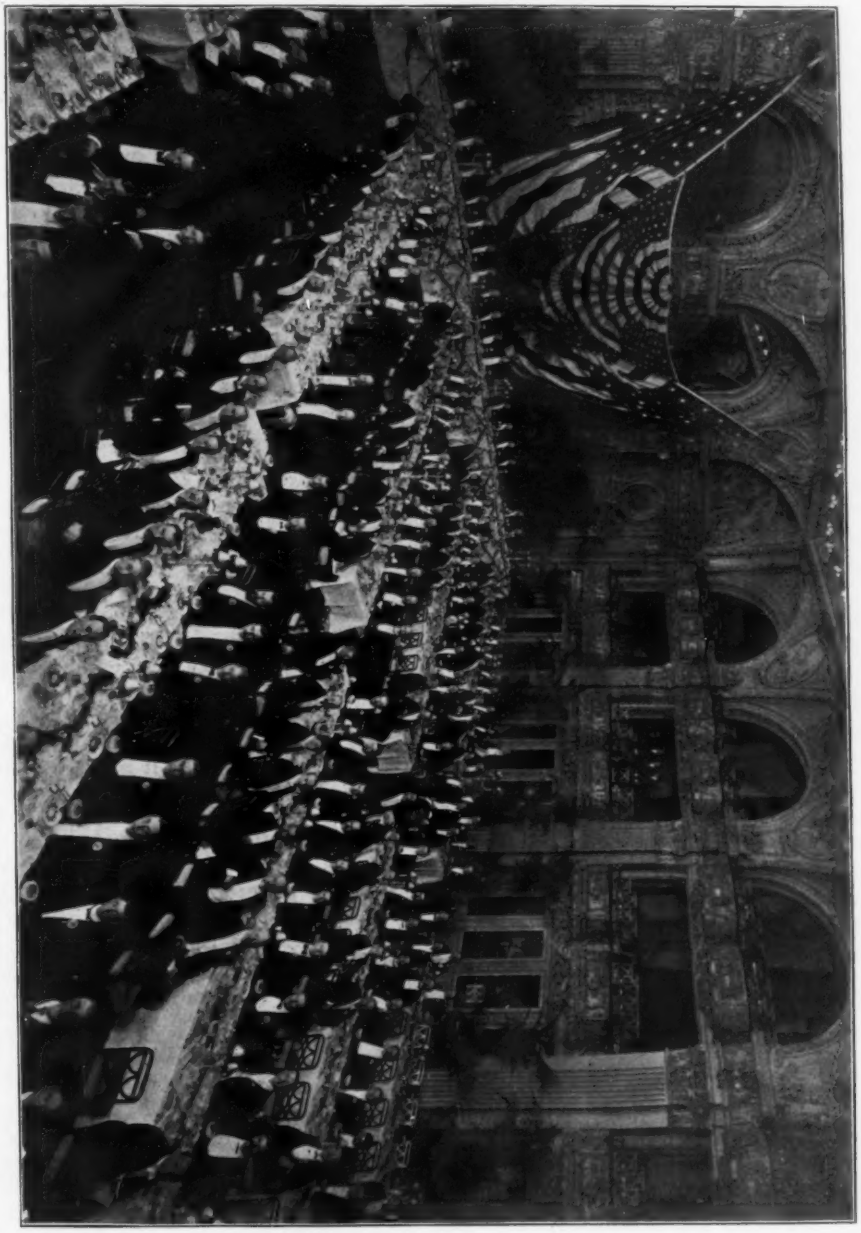
The following is the list of members to date: Universal Winding Company, Boston; Draper Company, Hopedale, Mass.; American Warp Drawing Machine Company, Boston; Macrodi Fibre Company, Woonsocket, R. I.; Kilburn, Lincoln & Co., Fall River, Mass.; Crocker-Wheeler Company, Ampere, N. J.; S. F. Bowser & Co., Fort Wayne, Ind.; Howard Bros. Manufacturing Company, Worcester, Mass.; Thos. Halton's Sons, Philadelphia, Pa.; Stafford Company, Readville, Mass.; Economy Engineering Company, Chicago, Ill.; Stafford & Holt, Little Falls, N. Y.; Chas. Cooper, Bennington, Vt.; Cling-Surface Company, Buffalo, N. Y.; Roessler & Hasslacher Chemical Company, New York; Cassella Color Company, New York; Textile World Record, Boston; Textile Manufacturers' Journal, New York City; Standard Mill Supply Company, Providence; Haskell-Dawes Machine Company, Boston; Arguto Oilless Bearing Company, Philadelphia; Brown-St. Onge Company, Providence; Philadelphia Drying Machine Company, Philadelphia; Westinghouse Electric and Manufacturing Company, Pittsburg; Tolhurst Machine Works, Troy, N. Y.; International Sprinkler Company, Philadelphia, Pa.; Pairpoint Manufacturing Company, New Bedford, Mass.; Emmons Loom Harness Company, Lawrence, Mass.; Textile Machinery Company, Boston, Mass.; L. H. A. Schwartz & Co., Boston, Mass.; General Electric Company, Schenectady, N. Y.; H. W. Butterworth & Sons, Philadelphia, Pa.

THE NEW YORK COTTON EXCHANGE BANQUET THE EUROPEAN SPINNERS.

The New York Cotton Exchange entertained the European visitors by a banquet at the Waldorf-Astoria on Wednesday, Oct. 2, the day before their start for the Atlanta Conference. The president of the Cotton Exchange, J. H. Parker, presided and in his opening address extended a cordial greeting to the foreign visitors and emphasized the community of interests between the Exchange and all branches of the cotton trade. He was followed by S. T. Hubbard, ex-president of the Exchange, who joined in the welcome and outlined the great growth of the cotton industry..

The next speaker was C. W. Macara, president of the European Cotton Federation. He recalled that the organization which he represented was brought into existence by the scarcity of American cotton in 1904. He said that the prospect of Lancashire being short of cotton was "appalling," and claimed that the threatened calamity was averted by the efforts of the European Federation, which at that time did so much to bring about general short time in European mills. He referred to the development of cotton growing in America, and called attention to the small product at the start. Today the United States supplies two-thirds of the world's cotton, and Mr. Macara said that in consequence of this con-

centration of cotton production, they, the European cotton spinners, had come to America to "confer" on the state of the trade. He stated that during the past year Europe had consumed 800,000 more bales of Indian cotton than in any previous year and seemed to think that this fact pointed to a means by which Europe could become independent of the American cotton belt. He failed, however, to refer to the fact that Indian cotton is a grade by itself, short and dirty, and adapted only for very coarse



THE BANQUET OF THE NEW YORK COTTON EXCHANGE TO THE EUROPEAN SPINNERS.

goods. In the production of what is known as "middling" cotton, adapted for a wide range of goods, fine, medium and coarse, the cotton of which European mills must have 10,000,000 bales a year if the European industry is to develop, America has a practical monopoly.

One statement made by Mr. Macara deserves special attention. Referring to the idea of bringing about a change in trade by which the planter would sell direct to the spinner, he referred to the scheme as "absolute nonsense." This is in line with the opinion stated in the September issue of this journal. The middleman must be reformed, not abolished.

The next speaker was Arthur Kuffler, president of the Austrian Association, who made the hit of the evening, in a speech that put every one in good humor. He scoffed at the idea of abolishing dealings in futures and told his hearers that what was needed was reform, by which the rules for selling cotton would be made not by traders alone, but by growers, spinners and traders acting in concert.

Mr. Kuffler was followed by Edward M. Weld, vice-president of the Cotton Exchange, Jas. R. McColl, of Pawtucket, R. I., G. Duvillier-Motte, of Tourcoing, France, Congressman John J. Fitzgerald, of New York, Adolph Waibel, of Augsburg, Germany, R. Macaya, of Spain, H. P. Taveira, of Portugal, and C. N. Fornes, of New York.

National Association of Cotton Manufacturers.

The semi-annual meeting of the National Association of Cotton Manufacturers, which was held at the New Willard Hotel, Washington, D. C., Thursday and Friday, October 3d and 4th, will be remembered as one of great importance and interest. The program as arranged and previously announced was carried out in detail and the interest manifested was shown by the large attendance at the different sessions. The meeting was presided over by President Wm. D. Hartshorne. After the regular call to order and the opening preliminaries the assemblage was most cordially welcomed to Washington by the Hon. Henry B. F. Macfarland, President of the Board of Commissioners of the District of Columbia, who in well chosen words extended the hospitality of the city in the name of the government.

The response was assigned to Mr. George Otis Draper, who responded in his usual happy manner in the name of the Association. Hon. James Wilson, Secretary of Agriculture, spoke of the importance and connection between the farmer and the manufacturer, the importance and value of agricultural knowledge and education, claiming most properly that the more intelligent the farmer and grower became, the better the products and results, and said that there was no class of growers of which this was truer than the cotton grower. Conditions were constantly improving and he was glad to be able to say that there was no trouble in giving to the manufacturers all the cotton they need today nor would there be any difficulty in furnishing all the cotton they might need in the future.

Secretary Wilson said: "The problem presented to our cotton growers is not so much the cost of labor he may employ, as it is the intelligence with which the crop is grown. We had experience along this line in growing rice along the gulf coast of the Southern States. It was found that one American could produce as much rice in a year as four hundred Orientals, so that our cotton producers do not have to fear lower wages in any other part of the world.

"The Department of Agriculture has been helping the cotton producers in every way within its power. The diseases of cotton and the insects that ravage the crops are being carefully studied. A few years ago the Sea Island cotton industry was threatened with a serious disease. The department scientist developed varieties of cotton that were resistant to this disease and re-established the industry. Through cotton breeding and selection many new types have been secured, and some of them have demonstrated their superiority over the ordinary kinds. Some of the finest upland cottons have been produced by this method and some of them are nearly equal to the Sea Island.

"The Department is teaching the necessity of seed selection, better methods of tillage, the use of legumes in furnishing nitrogen to the soil and the introduction of animal husbandry. It has been found that in proper seed selection the quantity of

lint, which has been around 200 pounds per acre, has been practically doubled, where experiments have been made. By better farming the amount of cotton now produced can be grown on half the present acreage, or by better farming we can double our production of cotton on the acres under tillage. The possibilities of cotton production in this country are practically limitless. The boll weevil has presented problems to which the scientists of the country have been devolving their energies. Now hybrids have been produced that are early, prolific and of fine staple that can be successfully grown in the regions invaded by the boll weevil. These cottons are not resistant to the weevil, but good crops can be produced from them on account of their earliness. The Department is working in advance of the pest with a view to securing cottons that will take the place of those now in use and will be sufficiently early maturing to escape the ravages of the insect.

"Our cotton-growing States have been hindered from getting the full benefit of the rotation of crops and the grazing of domestic animals on account of the presence of the cattle tick that has compelled the quarantining of those sections against the movement of cattle except during the winter months. The United States Government is exterminating this cattle tick. An area equal to the State of Virginia in size was cleaned of the pest in 1906, and an equal area will be cleared during the present year. In a few years this incubus on Southern agriculture will be entirely removed."

The attendance at the second day's session was greatly augmented by the arrival of the foreign delegates and their presence with that of the members of the cabinet and other government officials added much to the occasion.

President Hartshorne extended a cordial welcome to the Association's guests and introduced Mr. C. W. Macara, President of the International Federation, who begged to be excused from making any remarks and requested Mr. Arthur Kuffler, of Austria, to reply for him.

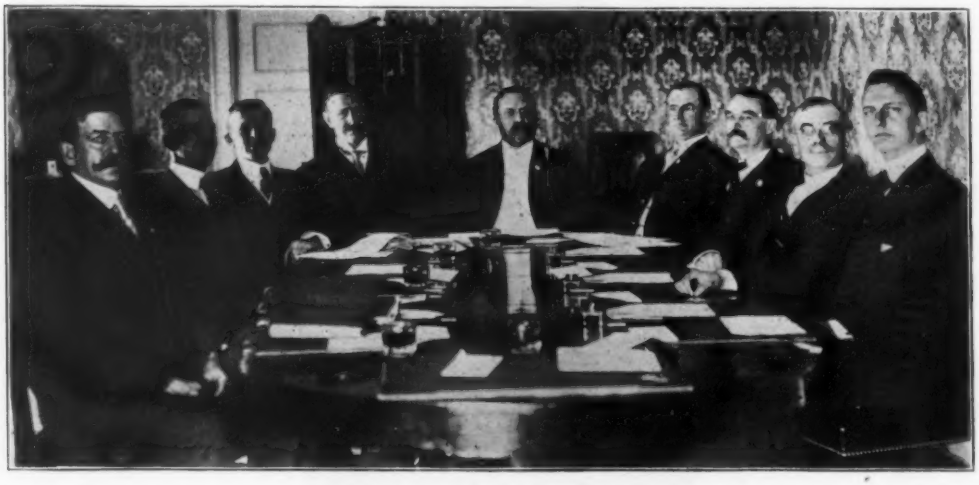
WILLIAM D. HARTSHORNE, THE PRESIDENT OF THE NATIONAL ASSOCIATION OF COTTON MANUFACTURERS.

Mr. Kuffler made a very effective response in which he appealed for co-operation by all branches of the cotton trade in such matters as do not involve any conflict of interests. The planter, the spinner and the trader are alike interested in the improvement of the American cotton bale, in the simplification of the methods of marketing cotton, in the improvement of the futures contract, and in many other problems. In such lines of

work, said Mr. Kuffler, all can afford to join. He said the International Cotton Federation would not be truly international until America became allied with it. Mr. Kuffler made an earnest appeal for such co-operation, and impressed his hearers with his sincerity, earnestness, and desire to find some common ground on which planters, spinners and traders can form a broad international organization for the purpose of regular conferences and common action for the general good.

B. Comins, Boston, Mass., Frederick B. Gordon, Columbus, Ga., William E. Hooper, Baltimore, Md., Fred Lacey, Lowell, Mass., William T. Lang, Knoxville, Tenn., Henry P. Meikleham, Lindale, Ga., R. M. Miller, Jr., Charlotte, N. C., John R. Mitchell, New York City, Frederic W. Reynolds, New Bedford, Mass., T. H. Rennie, Greenville, S. C., Arthur T. Smith, Langley, S. C.

Thursday afternoon was left free for the members and guests to visit the numerous points of interest.



MEMBERS OF THE BOARD OF GOVERNMENT.

Beginning at the left: C. J. H. Woodbury, Secretary, Geo. P. Grant, Jr., Fred A. Flather, Charles T. Plunkett, Wm. D. Hartshorne, President, George Otis Draper, Robert Beattie, Roscoe Milliken, Edward P. Green.

At the close of the Friday morning session an informal complimentary lunch was given to the guests of the Association, which added much to the pleasure of the occasion and was the means of bringing the members in close and friendly relations with the visitors. At this luncheon Mr. Macara read a letter from James Bryce, the British Ambassador, expressing regret that he was unable to meet the delegates and wishing them every success in their important work.

The President appointed Messrs. Plunkett, Draper, Montgomery, Miller and Foley as a committee on resolutions. The committee on meetings and to whom much of the success of the meeting belongs, consisted of: D. A. Tomkins, Charlotte, N. C., Chairman; Harry Butterworth, Philadelphia, Pa., Frank

FOR ACTIVE MEMBERSHIP.

GEORGIA.

Theodore S. Raworth, Pres. The Sibley Mfg. Co., Augusta.

MARYLAND.

Sewall K. Oliver, Asst. to Gen. Mgr. Consolidated Cotton Duck Co., Baltimore.

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William A. Fuller, Treas. Hudson Converting Co., Clinton.
Walter J. Holden, Supt. Boott Mills, Lowell.
Horace A. Keith, Treas. Brockton Webbing Co., Brockton.
David A. Russell, Gen. Mgr. Windsor Print Works, North Adams.
Arthur S. Thomas, Asst. to Gen. Mgr. Consolidated Cotton Duck Co., Lowell.
George A. Woodward, Gen. Mgr., Rockland.

NEW HAMPSHIRE.

Robert William Boys, Supt. Newmarket Mfg. Co., Newmarket.
James E. Coburn, Agt. Stark Mills, Manchester.
William Parker Straw, Gen. Supt. Amoskeag Mfg. Co., Manchester.

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Alfred L. Ferguson, Treas. Windsor Print Works, New York City.
Charles M. Howard, Vice Pres. Windsor Print Works, New York City.
Henry Kay Smith, Partner Jamestown Cotton Mills, Jamestown.

PENNSYLVANIA.

Joseph B. Miller, Pres. Miller & Sons Co., Philadelphia.
Theodore F. Miller, Stead & Miller Co., Philadelphia.

SOUTH CAROLINA.

Henry Shaw Adams, Agt. Union Buffalo Mills Co., Union.

AUSTRIA.

Arthur Kuffler, Pres. Austrian Cotton Spinners' Association, Vienna.

CANADA.

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James Dolphin, Supt. Mount Royal Spinning Co., Montreal.
Richard Thomson, Mgr. Penman, Ltd., Paris, Ontario.

ENGLAND.

Hugh Walkinson Macalister, Mgr. Dir. Springfield Spinning Co., Ltd., Manchester.

FRANCE.

Camille Lion, Lion, Verilhac, Lesouef, Maillard & Lacascade, Rouen.
Nicolle Rene, A. Avici et Cie Spinning Mill, Rouen.

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R. M. Mackintosh, L. H. A. Schwartz, Boston.
Russell Robb, Stone & Webster, Boston.
George W. St. Amant, Stephen M. Weld & Co., Boston.

RHODE ISLAND.

Frederic A. Chase, Treas. National Ring Traveler Co., Providence.

Following is a list of the members and guests present:

ACTIVE MEMBERS.

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George W. Holt, Agt. Monohansett Mfg. Co., Putnam.
J. R. Montgomery, Pres. The J. R. Montgomery Co., Windsor Locks.

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Edward W. Thomas, Gen. Mgr. Consolidated Cotton Duck Co., Baltimore.

MASSACHUSETTS.

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George A. Ayer, Supt. West Boylston Co., Easthampton.
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Frank B. Comins, Treas. American Moistening Co., Boston.
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Daniel J. Danker, Danker & Marston, Boston.
Geo. Otis Draper, Sec. Draper Co., Hopedale.
Frederick A. Flather, Treas. Boott Mills, Boston.
George P. Grant, Jr., Treas. Grant Yarn Co., Fitchburg.
Edwin Farnham Greene, Treas. Dwight Mfg. Co. and Pres. Lockwood, Greene & Co., Boston.
William K. Greer, Asst. Supt. Eclipse and Beaver Mills, North Adams.
Frank J. Hale, Gen. Agt. Saco & Pettee Machine Shops, Newton Upper Falls.
William D. Hartshorne, Agt. Arlington Mills, Lawrence.
Amos G. Hosmer, Mech. Supt. Lancaster Mills, Clinton.
Joseph B. Jamieson, Pres. Holmes Knitting Co., Boston.
Leonard Johnson, Supt. Page Mfg. Co., New Bedford.
Fred Lacey, Supt. Boott Mills, Lowell.
Berry Laycock, Supt. Franklin Mill Co., Franklin.
Frederick B. Macy, Treas. Soule Mills, New Bedford.
John P. Marston, Danker & Marston, Boston.
Charles T. Plunkett, Sec. Berkshire Cotton Mfg. Co., Adams.
Harry J. Ricketson, Supt. Merchants' Mfg. Co., Fall River.
J. C. Smith, Supt. Chace Mills, Fall River.
Rufus A. Soule, Pres. Soule Mill & City Corp., New Bedford
James P. Tolman, Pres. Samson Cordage Works, Boston.
Arthur F. Whitin, Pres. Saunders' Cotton Mills, Whitinsville.
C. J. H. Woodbury, Sec. and Treas., Lynn.

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Roscoe S. Milliken, Agt. Nashua Mfg. Co., Nashua.

NEW JERSEY.

Jesse A. Knight, Asst. Treas. and Supt. Argo Mills Co., Gloucester City.

NEW YORK.

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Henry F. Mansfield, Utica.
Pardon B. Sanford, Supt. Utica Knitting Co., Utica.
Thomas Henry Smith, Jamestown Cotton Mills, Jamestown.
John B. Wild, Pres. Oneita Knitting Mills, Utica.

NORTH CAROLINA.

R. M. Miller, Jr., Pres. and Treas. Elizabeth Mills, Charlotte.
Frank S. Tucker, Salesman Westinghouse Elec. & Mfg. Co., Charlotte.

PENNSYLVANIA.

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Wm. T. Westerman, Mgr. Ontario Spinning Co., Philadelphia.

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Jesse P. Eddy, Jr., Asst. Treas. Tillinghast, Stiles Co. and Pres. and Treas. Fitch Mfg. Co., Providence.
Arthur C. Freeman, Providence.
Albert H. Goff, Mill Supt. D. Goff & Son, Pawtucket.
James R. MacColl, Treas. Lorraine Mfg. Co., Pawtucket.
Edward J. McCaughey, Sec. Home Bleach & Dye Works, Pawtucket.

SOUTH CAROLINA.

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Clement A. Wakefield, Selling Agt. Saco & Pettee Machine Shops, Biddeford.

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Ezra Dixon, Pres. and Treas. Dixon Lubricating Saddle Co., Bristol.
Edmond H. Guerin, Mgr. American Paper Tube Co., Woonsocket.
Frederic W. Howe, Mgr. Providence Dept. Crompton & Knowles Loom Works, Providence.
E. R. Richardson, Asst. Treas. Howard & Bullough American Machine Co., Ltd., Pawtucket.
A. Curtis Tingley, Treas. National Ring Traveler Co., Providence.

RUSSIA.

Vladimir F. Gnesin. The Great Varoslavl Mfg. Co., Moscow.

GUESTS.

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John Barrett, Washington.
Moses Folsom, Washington.
O. H. Graham, Washington.
Robt. N. Harper, Washington.
Harrison Mills, Washington.
W. R. Humphries, Washington.
Wm. M. Johnson, Washington.
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M. V. Richards, Washington.

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ILLINOIS.

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H. A. Severson, Rockford.

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Craven Midgley, Lowell.
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F. L. Nagle, Boston.
E. E. Palmer, Boston.
Geo. W. St. Amant, Boston.
S. St. John Morgan, Boston.
P. O. Wentworth, Fall River.

NEW HAMPSHIRE.

C. M. Baker, Manchester.

NEW YORK.

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W. S. Bullock, New York City.
C. H. Clark, New York City.
C. H. Dickson, New York City.
E. A. Forkner, New York City.
C. A. Greene, New York City.
H. C. Hanson, New York City.
Edwin A. Hartshorne, New York City.
M. A. Hays, New York City.
Samuel T. Hubbard, New York City.
Laurus Loomis, New York City.
W. D. Martin, New York City.
J. Lee Nicholson, New York City.
R. Siedenburg, Jr., New York City.
S. H. Steele, New York City.
H. P. Willis, New York City.

NORTH CAROLINA.

W. C. Dowd, Charlotte.

OREGON.

Max Precht, Ashland.

PENNSYLVANIA.

T. V. Bolan, Philadelphia.

RHODE ISLAND.

A. A. Aspinwall, Pawtucket.
E. L. Merrow, Providence.

SOUTH CAROLINA.

V. Q. Guion, Greenville.

VIRGINIA.

R. K. Gilbert, Richmond.

AUSTRIA.

O. Anninger, Herman Broch, K. Fischer von See, E. Frieser, J. G. Haebler, Franz Knappe, Arthur Kuffler, Robert Mitscherlich, Hugo Moller, A. Raudnitz, Henry Riecken, C. Schindler-Dorer, Felix Wolf.

BELGIUM.

Albert Buysee, Marcel Buysee, Adolphe Hebbelynck, Carlos de Hemptinne, O. Vanderhaeghen.

CANADA.

A. O. Dawson, Montreal.

ENGLAND.

Richard J. Allen, Thomas Ashton, Albert Ashworth, Stanley Ashworth, Robert Banks, H. P. Bannerman, Edwin Barlow, J. R. Barlow, P. B. Barlow, R. H. Berry, George Buckley, C. A. Byrom, T. H. Chadwick, W. Chadwick, Samuel Clough, Thomas Coates, Frank Dickens, William Dodd, John Emery, T. H. Forgan, Oscar Griffiths, T. H. Haggas, T. Hallam, R. Holden, Wm. Howarth, H. O. Hutchinson, Wm. Hutchinson, R. H. Jackson, W. H. Killich, E. Latimer, James Lawrence, J. O. Lees, L. Lonsdale, Jr., J. L. Lord, H. W. Macalister, C. W. Macara, W. C. Macara, G. R. Marsden, J. W. McConnel, S. H. Milnes, W. C. Nation, G. R. Newton, Samuel Newton, W. J. Pearson, James Prestwick, Arno Schmidt, F. R. Sewell, C. R. Shaw, John Shaw, John Smethurst, John Smith, Randolph Smith, Ernest Stott, Harry Stott, J. B. Tattersall, J. M. Thomas, George Whitehead, Handel Whittaker.

FRANCE.

Paul Ancel-Seitz, G. Duvillier-Motte, A. Fremaux, Camille Lion, A. Mabire, Fernand Motte, R. Nicolle, Albert Pingle.

GERMANY.

Arthur Arnold, Moritz Brugelmann, Herman Burckhardt, Erwin Butz, Carl Clauss, Erich Fabarius, Max Goll, William Gross, J. B. Haeffele, Berthold Kahn, Herman Laurenz, Moritz Schanz, T. W. Schmid, Felix Schwartz, L. Steineger, Jr., Willi Supf, F. Uebel, Adolf Waibel.

ITALY.

Piero Bogni, Dr. Tullio Fosati, A. Sutermeister.

PORTUGAL.

H. R. Taveira, Henry Thumann.

SCOTLAND.

Edw. Parritt, Glasgow.

President's Address.

BY WILLIAM D. HARTSHORNE, Lawrence, Mass.

Fellow members and guests of the Association:—

It would at any time be appropriate that our national capitol should be a meeting place for The National Association of Cotton Manufacturers, but it is especially fitting that this, our eighty-third convention, should be held here at this time, on the eve, and in the pathway, as it were, of that Inter-

national gathering which is to assemble at Atlanta, Georgia, the coming week.

I esteem it a high honor, gentlemen, to have the privilege as your president of offering the right hand of fellowship to our foreign guests, whom we may expect to have with us, some perhaps today, and many more tomorrow, and I take this occasion to extend to them in your behalf a hearty welcome to the United States. Allow me also to bespeak for them your co-operation in the purposes of the Atlanta Conference, which I hope as many of you as possible will attend, to the end that there may be a useful interchange of ideas and experience of mutual benefit to the grower and spinner of our own country, and to the great industry of cotton spinning abroad which these gentlemen have come so far to represent. It is to be hoped also that this half-way point between the North and the South will prove itself to be of advantage as a meeting place not only to many of our members who seldom have the opportunity to meet with us, but to all members also of our sister organization, the American Association, who may honor us by their presence. It gives me great pleasure to extend to them both a most hearty welcome.

It has been customary—at least in the recent past—for your presidents in their addresses to review the business situation for the preceding six months, both from a commercial and technical point of view. It is not my purpose to do this, except so far as it may relate to the special subject to which I wish to invite your attention, namely: What is to be the effect upon the textile industries of the "growing pains" of so-called industrial education which has taken so rapid a hold upon the whole country? The subject of industrial education is a live one and a rapid evolution, if not a revolution, is before us, the results of which may be of vital interest. It behooves us, as manufacturers, to take account of stock and see where we stand.

It is not necessary for me to call your attention to the fact that this Association has for its primary object the gathering and promulgating of information which is of educational as well as commercial value to its members. Our direct interest in the work of the textile schools is shown in the annual award of medals to graduates of highest excellence in the cotton course at each of the leading textile schools in this country. A recent change in our rules in this matter has greatly enlarged the scope of opportunity for such award, without detracting from its incentive benefits.

As individual manufacturers there are many of us also who can testify to the good work being done by these schools, not only in the graduation of young men well grounded in the principles of manufacturing, but also to the material advantage to our ambitious operatives afforded by the evening classes in these institutions, where the mills are situated near enough to them for such opportunity to be availed of. Many of us know too of the broader, though in some ways doubtless less effective, opportunity afforded by the correspondence schools. These correspondence schools indeed cover a much wider field than textile subjects only, and I suppose there can be no doubt of their educational value within the limits of culture attempted. Do these correspondence and textile schools fill the full want of the cotton industry, or is there need of something further, either in their own development, our mill management, or in our public educational system as a whole?

The practical abandonment of the apprenticeship system in this country, except in a few isolated cases like the Baldwin Locomotive Works, in Philadelphia; the Brown and Sharpe Manufacturing Company, of Providence; or the great railroad shops at Altoona, Pa., is bringing about a want of skilled workmen which the modern industrial system is failing to supply. The great industrial demand of the present, and of the recent past, is making this want felt more and more sharply. The whole country is awakening to the necessities of the case, and demanding a remedy. What shall that remedy be? And how will its influence affect the cotton industries in particular?

The Commonwealth of Massachusetts—generally to the forefront in such matters—undertook to investigate the conditions, and the question of remedy, through a commission appointed by the Governor, in June, 1905. This commission reported to the Legislature the results of its labors in April, 1906. This report was not by any means exhaustive, though its investigations were well conducted, and many of its findings deserve careful consideration. Indeed this report has been followed by similar commissions appointed in other states, and in Massachusetts at least it has awakened a widespread interest in educational circles, as well as in industrial communities. While not seemingly discounting the effectiveness of the present common school system, it does emphasize its insufficiency. Measured by the general result in academic culture, there is no doubt that the modern common school compares favorably with such schools in the past, but the effort to turn out all children upon the same model is certainly not in all cases to the advantage of the individual. The waste of time to the more slowly developing children who fail to keep up is quite as great indeed as to the many who are necessarily held back. In Massachusetts, for instance, the law prohibiting the employment of illiterate minors between the ages of fourteen and sixteen years has brought to light cases of children who have been in school regularly until they reached the age of fourteen, who have not yet acquired such elementary knowledge as the law requires, and yet whose imitative powers are well developed, and whose capacity for mechanical work is quite sufficient for their self-support. On the other hand, our grammar schools are sending into the high schools as large, and generally a better qualified quota of graduates than heretofore, and it is also true that high school graduates are taking high standing in our colleges, normal schools and technical schools.

Two significant phrases have lately entered educational discussion: One is "self-realization" and the other is "industrial intelligence." The difference in the needs of individual children is being recognized and the opportunity for self-realization and the impartation of industrial intelligence is becoming a matter of public concern. There is a growing conviction that the scheme of public education must in some way be broadened to include the physical and manual as well as the mental development of our boys and girls.

It may be true that before the days of the fac-

tory system, juvenile apprenticeship was a system of slavery, but the child, whether on the farm, in the household or elsewhere, was taught not merely in however slight degree, such information as books could furnish, but the various details of housekeeping, such as the preparation of food, the care of children, how to dust, wash, iron and sweep; to spin, weave and dye; also the care of domestic animals, the propagation and care of plants, tillage, harvesting, etc.; and in all matters to do things which belonged to the livelihood of the times. In learning the orderly processes of their respective industries and seeing the necessity of continuous effort, they learned the practice of the small economies which are the basis of frugality and thrift. They learned to fit means to ends and became ingenious and inventive. They learned that where many worked together every little helped, and that only by mutual help could the best results be obtained. It may be true that reading, writing and ciphering were less appreciated and perhaps less needed than now, but that appreciation has advanced together with scholastic opportunities until the problem for today is how to retain the good features of the academic effort while restoring those which tend to develop the whole boy or girl.

As President VanCleave of the National Association of Manufacturers, well says: "Let us send the whole boy to school." He would "attach a manual training department to every public primary school in the United States," the aim being that every boy of fourteen years of age, of average industry and intelligence will have been taught not merely to read and write, but to use his hands with some degree of skill; to use the tools of the several mechanical trades; in a word, to acquire self-realization, and something of industrial intelligence. For the majority this will necessitate no more hours of school work than are now devoted to the academic features alone, for information so imparted will quicken the activities of the mind in all directions, and perhaps afford an incentive to remain at school beyond the compulsory period. The conclusions and recommendations of the Massachusetts Commission are in line with this thought; but they go further and recommend an industrial school system independent of the public school, and following the grammar trade, or at least taking the child after fourteen years of age, and supplying a sort of high school in the trades: not simply a manual training school, such as is now attached to the public high school system, but having for its specific object the imparting of a knowledge of mechanical arts as applied to individual trades; a vocational rather than simply an educative system of schooling.

Their report contains the results of a careful investigation of the industrial situation in Massachusetts, particularly in reference to the employment of children and minors and has classified the industries as being unskilled, low-grade skilled and high-grade skilled. The investigator found that children under sixteen years of age who may be employed are largely, if not wholly, in the unskilled industries, chief among which is ranged the cotton industry. This same investigator tells us:—

"It is dissatisfaction on the part of the child which takes him from school and ignorance on the part of the parent which permits him to enter the mill." . . . "That neither power nor advantage is gained by entering the industry at an early age; that the child who does enter closes behind him the door to progress and a fair living wage; that the child associates himself with our most undesirable population; that the work performed by the children is passing to poorer and poorer classes of foreigners; that industrial education, or education of any kind, will mean that children will not enter the industry—are facts which the State must face. The State should not insist on keeping all its children in ignorance to support industries in which industrial education is of little value."

Gentlemen, does this indictment belong to our industry? Is it true, as further stated in this report, that "it is the child's work only which the employer declares cannot be improved by higher intelligence, or more education," though "he universally clamors for more intelligence in his older and more advanced workmen?" Let us see what this same report tells us of the actual situation.

From very careful investigation it concludes that during the year 1905 there were some twenty-five thousand children in Massachusetts between the ages of fourteen and sixteen years who were either at work or idle and that five-sixths of these children in the cotton mills had not graduated from the grammar schools and a very large proportion had not completed the seventh grade. Surely this would seem to indicate that such children had reached the age of fourteen with less schooling than they should have had if our school system had met the situation properly and that such knowledge as they had acquired was not of a high order. If it is from this class of native recruits that our mills are being supplied, is it to be wondered at that we are finding them more and more inefficient, shifting from one mill to another, apparently seeking less work or responsibility rather than more wage and that our dependence is increasingly placed upon nationalities of lower standing than our native population is supposed to be, but whose amenability to discipline properly applied gives us more effective results? It may be fortunate, indeed, that the improvements in machinery have so advanced that such unskilled help can be employed at all.

On the other hand, certainly if our youth are to be trained up for the higher skilled industries only, such as specialized trades in general, as would seem to be implied as intended by the industrial commission, there will be nothing left for us to do but to continue to call more and more upon the unskilled foreigner and to get and to keep if we can, these unskilled, undeveloped children in their earlier years and endeavor to impart such instruction as our own business requires. Necessity seems to demand then that we look to our technical schools, of which our industry may well be proud, not only for the technical training of the high-skilled workmen, but also for the performance of something of the functions of the normal school, for whether we like it or not it would seem that our mills must become more like schools than we have considered them in the past.

In his admirable address before this Association at our meeting last year, Dr. Talcott Williams well stated the case that it is not true, as we are constantly told, that the factory has enslaved the child, but as a matter of fact it would be more just and accurate to say that the factory has emancipated the child, and that the work of the textile manufacturer has done as much to lift the general level of labor and advance its environment as the work of any other employer whatever. Yet, during this upward and forward progress "he has been continually accused of offences which he never committed, and held responsible for conditions he never created."

The commission on Industry and Technical Education previously referred to places the situation still more fully before us:—

"With the advent of the factory system, the introduction of machinery, the making of machines more and more automatic, the division and subdivision of labor, the apprenticeship system gave way in the trades and manufactures." . . . "While this change in the vocations was going on, another change was also in process. The schools were gradually claiming more and more time, the school year was lengthened, school attendance was made compulsory, and the age limits were raised. Every day lost by the apprentice system was gained by the school, until imperceptibly, under steady pressure, the school came to stand alone as the only means of training, and the child came to be almost wholly separated from the ordinary activities of life." . . . "In the place of two systems of training, balancing each other and mutually co-operative, there came to be but one, absorbing all the time and thought and interest of the children and youth: . . . a system of education isolated and one-sided." . . . "There is a one-sided sense of values, a one-sided view of life, and a wrong attitude toward labor. Not having any share in productive labor, and being out of touch with it, the youth have no standards by which to measure time, or possessions, or pleasures in terms of cost. Many persons believe that about this point centre some of the gravest present day social problems."

Again, what shall be the remedy? Shall it be only the so-called industrial training as a part of the school life? Or, as supplementary to it, allowing the child to earn something by the work of his hands, particularly to learn to adjust himself to manufacturing conditions, whether they be those of the factory or of the mechanical trades? Can this be done except in the factory, or in the trades themselves?

Following the report which we have quoted so often, the legislature of Massachusetts created by appointment of the governor a new commission of five persons, with extended powers and duties, whose first annual report was submitted in March, 1907. This commission consists of able men, and they are coming to their task depending largely upon local and State Boards of Education, as well as the industries of Massachusetts to help them to a proper solution of the problem before them. Their investigations are still to continue, but they are ready to co-operate with any community—the state paying half the cost—to establish industrial schools and follow the children from fourteen up. At present they do not propose, nor have they the power, to interfere with the curriculum of the common school. Let us hope, hopever, that they will continue to meet with what appears to be hearty co-operation on the part of school authorities in general, for personally I do not believe the system proposed would alone fully meet the problem for the education of the whole boy, because it does not begin early enough.

For the education of the mechanic, and for the technical side of the textile industries, there would seem to be no doubt that proper schools of instruction, on top of our elementary school work, beyond the age of fourteen could be of great advantage. It still remains true, however, that the preliminary operations of the cotton mill, and of textile factories in general, do not require a high order of skill. The mental requirements are essentially those of discipline, and the skill is that of the fingers rather than of the intellect:—processes of work which are easily acquired when young, but almost beyond attainment after a certain age. It has been often said, in the worsted industry at least, that a grown woman can never learn to spin: she must begin as a child to acquire the suppleness of the fingers which is necessary. Such mechanical dexterity it would seem almost impossible to gain outside of the mill itself.

While visiting a mill in South Carolina some years ago, I was struck by the presence in the spinning room of young children, of seven, eight, or nine years of age, who seemed to be there with their parents. Some of these I noticed were piecing up ends and I asked the question:

"Do you allow such children as these to work?"

"Oh, no! They are simply learning to piece up ends. They will come in to work after they get older."

Some of us at the North are in the habit of complaining of the lack of uniformity in labor laws, and more of us perhaps have thought the South was getting undue advantage by reason of its long hours of work, and the earlier age at which children could be employed. Uniformity throughout the United States would certainly be desirable, and undoubtedly will in time be accomplished to a certain degree, but if there be any advantage to the Southern manufacturer in this somewhat loose way of teaching a child, can we not everywhere, through the efforts of our industrial commissions, with our co-operation, embody the idea in a proper school and mill training system? Of course we all know something about the half-time system, so-called, once in vogue in England, and of which we still hear commendatory comments. Would it be revolutionary for us to suggest that a certain amount of work in the factory itself be at least allowed by law as a part of the education required of every child in the community where factories are in operation? We may dislike to propose more legislation, but is it not time some of it was coming our way? If we could bring this about would not the factory be still further deserving of the title "Emancipator of the Child?" Would we not by so doing give back in part the harmonious development of an industrial system that has passed away, and make more complete the educational condition of our country?

Without intending it, perhaps, the report of the investigations above referred to seems to display an undercurrent of disapproval of the so-called un-

skilled industries, and the efforts toward industrial education recommended are in the opinion of the investigator such as will keep young people away from the cotton mill, the cry being that when the child has once entered the factory there is no way out or up. From a sociological point of view one can understand such an attitude, but if the industrial commission is to benefit our industry as well as others some effort should be made by which to get good help into our mills rather than out of them. Can we not assist them in this respect? Attention is called frequently to the more desirable occupations. Why cannot we make our industry as desirable as any for the employment of labor, by adopting some systematic method of workmanship development wherein the incentive to improvement shall take on a definite form, so that not only shall the outlook be good for the specially ambitious and better educated starter, but—within the capacity of the individual—for all who can be reached by well directed efforts towards self appreciation, whether recognized by the pocket-book or not? Indeed, the latter would seem to be an incentive only where some other ambition had first been aroused. The undeveloped individual, whether he be black or white, works only as necessity demands, and no inducement of increased wage, as such, can keep him employed so long as the necessities of life as he understands them are met. Thankful should we be, therefore, for all efforts to raise the standard of living in its broadest sense, for this will develop the standard of workmanship, and however embarrassing the present efforts to educate our people beyond the mere necessities of our special industry, we cannot fail to profit in some manner from such efforts, if we rightly take advantage of them.

The Economic Position of the New York Cotton Exchange and Its Relation to the Cotton Trade.

BY ARTHUR R. MARSH, of the New York Cotton Exchange.

It is the fashion to say that New York is not a natural cotton market, and that the business of the New York Cotton Exchange is mainly speculative. The voice of the Southern agitator is heard in the land, declaring that the New York Cotton Exchange is part of the malevolent machinery of Wall Street; that it is dominated by unscrupulous gamblers; and that it were better for all those having a legitimate interest in cotton, whether as producers or consumers, if the blight of its malign influence could once and for all be removed. It is true, to be sure, that at least three-fourths of the annual cotton crop of the United States is handled by members of the New York Cotton Exchange. It is also true that yearly transactions in actual spot cotton are larger in New York than in any Southern market, except New Orleans and possibly Memphis. Yet the cry continues that New York has no natural or necessary place in the great economy of the world's cotton business; and that the greatest single benefit that public sentiment or legislation could confer on this business would be the elimination of the New York Cotton Exchange.

I have the honor to be before you today—myself one of the unscrupulous gamblers of the New York Cotton Exchange—given an opportunity to show you, if I can, that this institution may perhaps have a use in the commercial world; and that slowly, gradually, as the years have gone by, as the broad acres of the South have given ever more abundantly of their increase of cotton, as the new spindles from one end of the world to the other have begun to hum by the tens of thousands and hundreds of thousands and millions, the New York Cotton Exchange has proved to have a function, hardly dreamed of by its own founders, yet of such vast and far-reaching importance that the cotton business of today is simply inconceivable without it. To explain this as briefly as may be is the difficult task which I have undertaken today.

A bit of the history of the past is often a help towards understanding a present condition, particularly when that present condition is the result of an evolutionary process, and has come about through the efforts of many able minds to adjust themselves to the underlying necessities of the business in which they find themselves engaged. The New York Cotton Exchange, as it is today, is the result of just such an evolutionary process, and the place it occupies in the commercial world is the result of the gradually perceived necessities of the cotton business as a whole, and not the result of a preconceived program of any one man or any group of men. A little of the history of the cotton business in New York will make this clearer.

Before the Civil War the cotton business in New York was simply one form of the old-fashioned commission business, exactly like the business of handling molasses, sugar, hides, wool, country produce, and many other similar agricultural commodities. Indeed, at the start one and the same commission merchant generally dealt in several of these commodities at the same time, insofar as his capital permitted. In methods of doing business these early cotton commission merchants of New York differed little from the small interior country merchants or factors of today. Like them, they advanced money for the raising of the crop, either directly to large planters, or through trusted Southern correspondents to smaller planters in selected localities. When the crop had been picked and ginned, the planters, as a matter of course, shipped it to New York to be sold by the commission merchants for their account, thus repaying the advances which they had received, and obtaining, if Providence was kind to them, some small balance as profit on their crop. Commissions, interest and expenses were what would now be regarded as extortionately high, and wastefulness marked every step of the transactions; but human wit had found no better way, and what could not be cured must be endured. Thus it was that New York annually got a stock of cotton for sale; and to New York came the small New England spinners to obtain the weekly or monthly supply of the raw material which they needed.

The Civil War completely upset the regular conduct of the cotton business in New York, as just described. While it lasted, there were, of course, no regular shipments of cotton to New York from the South, and the only source of supply consisted of lots of cotton which the Government from time

to time got hold of through the capture of blockade runners or through confiscation in the South. Naturally such lots could not be handled on a commission basis, but had to be bought outright as a speculation. The huge profits made by some of those who bought this Government cotton was the real beginning of general speculation in cotton in this country. And the same thing had happened across the water, in Liverpool. The fierce demand and the uncertain and inadequate supply gave opportunities for vast and sudden profits such as have never been seen before or since in connection with any commodity. And, curiously enough, it was out of this wild speculation of the time of the Civil War that the entire modern method of handling the cotton business was evolved. For, in their eagerness to get hold of cotton, speculators began to buy not only actual cotton on the spot in New York or Liverpool, but "cotton to arrive" when they got wind of a lot of cotton on some ship destined for one or other of those ports. Here was the beginning of the system of trading in cotton futures, which has gradually revolutionized the whole cotton business in every root and branch. For certain very clever men, whose business was that of cotton merchants and not speculators, saw a way to make use of the extensive trading in contracts for "cotton to arrive" as a protection to themselves in their legitimate buying and selling of actual cotton.

It was two or three years after the Civil War that this new conception of the cotton business took shape in the mind of one of the most brilliant cotton merchants the world has ever known, the late Mr. John Rew of Liverpool, whose firm is still in existence. In 1868 or 1869, Mr. Rew saw that the newly laid Atlantic cable made it possible for a cotton merchant in Liverpool to ascertain with unheard-of quickness the price at which actual cotton could be bought in the Southern States, and the approximate date on which it could be shipped to England. He saw also that if the price that was being bid in Liverpool for "cotton to arrive" was high enough to enable him to buy the cotton in the South and sell contracts for this same "cotton to arrive" in Liverpool two or three months later, he could enter into the transaction with entire safety, as when his cotton reached Liverpool, he could either deliver it to the parties to whom he had sold the contracts, or, if some spinner was willing to pay a higher relative price than the holder of the contracts had agreed to pay, he could buy back his contracts and sell the cotton to the spinner with the larger profit to himself. Here was a method, then, by which Mr. Rew or any other importer of cotton into Liverpool could relieve himself of the great risks attending the handling of a commodity which had become highly speculative, and go serenely about his business of importing cotton into Great Britain, able to make a fair profit on every importation and yet always able to work on a much narrower margin than any of his old-style competitors, because they were carrying the merchant's risk, with its alternate profits and losses, while he had only profits.

The immediate and large success obtained by Mr. Rew in his new way of conducting the cotton business attracted the instant attention of the ablest cotton merchants both of Liverpool and New York; and when, a year or two later (in 1870 and 1871, respectively), the Liverpool Cotton Association and the New York Cotton Exchange were organized, the best men in the trade had adopted the new scheme as the basis of their business. Already before the organization of these great exchanges the methods of dealing in contracts for "cotton to arrive" or "for future delivery" had become fairly well systematized. For example, the contract unit had already been made 100 bales, or rather a sufficient weight of cotton to be equivalent to about 100 bales as generally put up in the South. The period during which delivery might be made under the contract had been fixed at two months in Liverpool, and one month in New York, the reason for this difference being that in those days the duration of an ocean voyage to Liverpool was necessarily uncertain, and it was considered fair that a delivery of cotton out of a vessel arriving at any time during two coupled months should be a good delivery. Hence we have to this day (though such will not be the case after Jan. 1, 1908) all the trading in Liverpool contracts done in coupled months, i. e., May-June, July-August, January-February, etc. In New York, on the other hand, it was felt that the arrival of cotton could be calculated within a single month, and so contracts for future delivery covered only one month, January, March, July, etc. These details and many others were at once embodied in the By-Laws and Rules of the Liverpool and New York Exchanges, and other By-Laws and Rules were adopted to produce absolute uniformity, equality, and fairness in all trading, whether between members of the Exchanges themselves, or between members and the public at large. Here, then, at last the cotton merchants who had seized upon Mr. John Rew's new method of conducting the cotton business had all the facilities they required. They had organized exchanges with fixed rules governing all contracts, and bringing together a larger number of persons engaged in trading in cotton than ever before; they had constantly increasing telegraphic and cable facilities, greatly diminishing risk by eliminating delay; they had hitherto unknown facilities for gathering information about every aspect of the cotton business,—the crop, the needs of spinners, the state of trade, financial conditions in general, the rate of interest and exchange everywhere, and as time went on even the weather in every part of the country. They were thus enabled to do an ever larger and larger business, with an ever diminishing margin of profit, and at the same time to give both the producer and consumer an efficiency of service utterly impossible in the old merchandizing and general commission-house days.

There was, however, one serious defect in the conception of these first modern cotton merchants of the true and lasting basis of the very thing upon which all their operations were based, i. e., the contract for the future delivery of cotton as entered into upon all the great Exchanges. And, curiously enough, this misconception has persisted to the present day even among many members of the Exchanges themselves, and particularly on the part of the public at large. Indeed, I feel sure that many of my present hearers labor under this misconception, and probably regard transactions

in cotton futures somewhat askance for this very reason. This misconception arose from the very state of things that Mr. John Rew and his successors took advantage of to develop their new scheme, namely, the constant and violent speculation in cotton resulting from our Civil War. It is unquestionably true that in Mr. John Rew's mind the only buyers of contracts for "cotton to arrive," or "for future delivery," were speculators, who preferred to buy a contract, involving no immediate payment of the full value of the commodity, rather than to dig into their pockets at the outset and saddle themselves with interest, warehouse charges, insurance, etc., into the bargain. To the early cotton merchants of the new school, then, the Cotton Exchanges were undoubtedly the abode of cotton speculation; and the early idea was that the merchant could make use of the everlasting propensity of the speculators to buy, so as to insure himself against the ups and downs of the market. Let the speculator take the risk, was the watchword, openly uttered; and the opinion became universal, within and without the cotton trade, that without speculation the Cotton Exchanges could not exist.

Now, to organize Cotton Exchanges on such a conception as this was simply to build houses on the sand. If this motion had been the true one, we may be sure that both the Liverpool and the New York Exchanges would long since have disappeared. There is nothing in the world more uncertain and fleeting than speculation in any given commodity. Though the desire to speculate ever endures in the human heart, the object towards which it is directed changes more rapidly than the shapes in a kaleidoscope. And it is strange that thinking men in the cotton trade itself should even today continue to believe and assert that the very basis of this greatest of all modern businesses is that very will-o'-the-wisp of human activities, i. e., speculation. One would think that the absurdity of such a supposition would be brought home to every mind by the mere contemplation of the figures and amounts involved. It was perhaps not so strange that Mr. John Rew and his contemporaries, knowing that at that time only a few hundred thousand bales of cotton had to be carried at any one moment by speculators, to imagine that in selling future contracts they were dealing only with speculation. But how can anyone today, realizing the millions of bales that have to be carried at times by someone, and realizing the hundreds of millions of dollars of credit or actual cash involved, suppose for an instant that the real basis of the great contract markets is speculation?

And now I am coming to the question of the true function of the New York Cotton Exchange today. This is not, believe me, to afford a ready place for cotton speculation, nor even to furnish spot merchants with cheap insurance against loss on their transactions. We certainly have speculation on the New York Cotton Exchange, sometimes in greater, sometimes in less volume, and for my part, I think it will be a sorry day for the country if ever we give up trying to forecast the future and risking something of what we have in the hope of gaining more. But though this is so, speculation is not today the main or even a large part of the business of the New York Cotton Exchange. I am perfectly confident that an actual analysis of the transactions of the New York Cotton Exchange for a day or a week or a month or a year (if such analysis were possible), would show that not 25 per cent. of those transactions are speculative. Indeed, I believe the proportion is far less than this. The truth is that silently, unobserved, uncommented-on, a new kind of use of future contracts in cotton has developed in the great Exchanges, giving them a new basis and a new and vastly more important function. Though the offspring of the old use, this new use is in its most essential characteristics very different and very remote from its parent. This new use of the cotton future contract is as a simple means of employing the resources and the credit of the producers, the manufacturers, and the consumers of cotton from one end of the world to the other, to distribute the immense total risk involved in this greatest of all present human industries.

Do you ever stop to think, gentlemen, of the vastnesses of these risks? Of the huge credits involved in getting each year's crop of cotton from the farmers' fields to the wearers' backs? Of the fearful losses that might be incurred all along the line if there were no means of distributing the risk practically over the whole human race? We are now dealing every year with probably 20,000,000 bales of cotton of all growths, worth more than $1,000,000,000. In addition to this we have to carry all the time at least six months' output of all the spindles and looms of the world,—yarns and goods that have not yet reached the ultimate consumer. These are worth at least $1,000,000,000 more. In other words, the cotton industry of today means a constant strain on the liquid financial resources of the world of at least $2,000,000,000, to say nothing of the capital invested in the farms that produce the cotton and the mills that manufacture it. Obviously here is a stupendous load, involving in the aggregate enormous possibilities of loss. It is inconceivable that credits could be obtained for such vast transactions, unless it were known that there were means of so distributing the risk that the individual merchant or manufacturer was not likely to be crushed by his share of the burden And, gentlemen, the important of all existing means of accomplishing this today is the contract for the future delivery of cotton, as made in all the great Exchanges, but particularly on the New York Cotton Exchange Here is the new use, far transcending in importance the old use, of the trading in contracts on these Exchanges.

Now, gentlemen, every important function of the organized effort of men must have an underlying reason founded upon some necessity in the conduct of the world's business. And this reason can always be expressed by one clear-sighted enough to penetrate to the inner nature of things, in the form of a conception or idea that will be found to dominate more or less consciously the practical carrying out of the function. As the cotton trade in general puts it, the underlying idea in modern trading in cotton future contracts is that of the "hedge." All cotton men today know, or think they know, what a "hedge" is, and how it is used. As they would state it, a "hedge" is the purchase or sale of contracts for one hundred or more bales of cotton for future delivery made not for the purpose of receiving or delivering the actual cotton, but as an insurance against fluctuations in the

market that might unfavorably affect other ventures in which the buyer or seller of the "hedge" is actually engaged. In truth a "hedge" is all this, and a great deal more. And it is this genrally unstated additional element in the "hedge" that is the most interesting part of it. I shall try, as briefly as possible, to show what this is; and if I succeed in making it clear to you, I shall also have made clear the true function at the present time of the New York Cotton Exchange.

The modern "hedge" in cotton does not rest upon the idea held by Mr. John Rew and his contemporaries that there are always speculators in cotton whose enthusiasm can be made use of by cold-blooded merchants to insure themselves against loss. It rests upon the perception, which has slowly and often dimly come to many minds in the cotton trade, that all the different kinds of cotton in the world, stand, by and large, year in and year out, in fairly fixed relations to each other as to value; and that furthermore all the different kinds of goods manufactured out of cotton stand within reasonable limits in fairly fixed relations, as to value, with all the different kinds of cotton; and that, finally, all the raw cotton and all the cotton goods in every part of the world stand in fairly fixed relations of value with the price of raw cotton at New Orleans, Liverpool and New York. In other words, given the price at which raw cotton can be bought and sold in these great markets, any expert can figure out approximately the value of cotton at any point in the Southern States, or in New England, or at Milan, or at Augsburg, or Moscow; and also the value of cotton sheetings in Shanghai, or Calcutta, or Aden or Buenos Aires. There are, of course, multitudinous minor variations of value at these various places, dependent on local supply and demand; but in general the statement as a whole is correct.

Now this great principle is the basis of all "hedging" in the cotton trade, and in particular of hedging by means of contracts for future delivery on the great Exchanges. It has gradually become clear to the cotton manufacturer that, when he has offered to him a contract for his goods calling for, let us say, 1,000 bales of Good Middling cotton, he does not have to reject the contract simply because he does not at the moment know where to put his hands on 1,000 bales of Good Middling cotton. He can protect himself by buying 1,000 bales of any kind of cotton, anywhere, sure that when he finds someone to sell him the 1,000 bales of Good Middling he requires, he can himself sell out the 1,000 bales of other cotton he has bought as a hedge at a price fairly relative to what he has to pay for his Good Middling. In the same way, the man, whether cotton producer or merchant, who has on hand some cotton for which no immediate buyer is in sight, is not left helpless, exposed to possible loss through a decline in the market. He can sell in one of the great markets a contract for an equivalent amount of cotton for future delivery, knowing that when his buyer turns up he can dispose of the actual cotton in his possession at a price fairly relative to that at which he can buy back the contract he has sold.

Here, then, we have the simple principle which conservative non-speculative merchants, manufacturers, and even to some extent cotton-producers, have perceived to give them a method of conducting their business without having to face the possibility of disastrous losses. It is inconceivable that the cotton trade having once begun to use this principle should ever give it up. On the contrary, the time will surely come in the near future when any merchant or manufacturer who does not avail himself of this method of conducting his business will be justly regarded as an out-and-out gambler, without credit from the banks, or stockholders, or the commercial public at large.

And now to come back to the great cotton exchanges, and particularly the New York Cotton Exchange, and to the function they perform in connection with this great principle of "hedging," through the use of contracts for future delivery. It is obvious that if "hedging" were confined to its most elementary form as described a moment ago, that is, if the buyer of a "hedge" had to buy and pay for so much actual cotton, or the seller of a "hedge" had to ship his actual cotton to the market where he had sold his "hedge," both would be put to great and needless labor and expense. The desirable thing is that both these transactions should be made credit transactions, like all the great financial transactions of the present day. And this is exactly what has become possible through the machinery of the cotton exchanges, by means of contracts for future delivery. Through this agency the man who wishes to buy a hedge is brought into instant communication with the man who wishes to sell a hedge; and though the one may be in Nagasaki and the other in San Antonio, and the one may never have heard of the other, yet through commission houses that guarantee the credit of the one to the other, the contract may in a flash be made between them, to their mutual benefit.

It is the custom of loose-thinking, loose-talking agitators to declare that the very fact that the annual transactions in futures on the New York Cotton Exchange amount to many times the entire cotton crop of the United States is proof positive that the bulk of these transactions are gambling pure and simple. Nothing could be more absurd. The multitudinous "hedging" transactions I have just described so exceed in volume the speculative transactions, that the latter are entitled to very small consideration on the part of the members of the New York Cotton Exchange. And every year this is more and more the case, as the merchants and particularly the manufacturers of the world give over their gambling, and avail themselves of this sure and safe method of insuring themselves against loss.

One other matter I shall touch briefly upon, and then I shall have done. The great business of the New York Cotton Exchange today is the interchange of guaranteed credits between the innumerable persons engaged in the production, manufacture and distribution of cotton. Its function in the cotton world is like that of the Bank of England in the financial world. But just as the Bank of England in bringing together the credits of the remote parts of the world must itself provide that in every case these credits are real, and represent not hopes and expectation, but actual gold, so the New York Cotton Exchange must provide that behind every contract for the future delivery of cotton there is a reserve of actual cotton to deliver. There must be no wild-cat trading on the New York Cotton Exchange. And, in fact, there is such a reserve of actual cotton in New York, maintained there by the operation of the By-Laws and Rules, which time and experience

have proved to be singularly wise and effective, notwithstanding all the criticisms that have been directed at them in exceptional seasons. Automatically, almost, this reserve of actual cotton comes to New York every year, drifting in and drifting out, as the varying conditions of trade compel. It is behind every contract for future delivery entered into on the Exchange, like the gold reserve of the Bank of England behind all its acceptances. It is carried in the market by strong firms that make it their business to bring it to New York and to ship it out to spinners as occasion arises. Ordinarily the buyer or seller of a "hedge" pure and simple need not trouble himself about it, nor is he affected by it in his credit transactions, except in so far as he pays a sufficiently higher price for distant months to cover the cost of carrying the cotton. But its presence in the market assures him that the quotations for future contracts are not of a wild-cat kind, but represent real values.

And now a final word as to the reason why the New York Cotton Exchange, though not in the cotton producing states, and not in the most direct course of the bulk of the cotton crop from the producer to the spinner, maintains itself in the face of abuse and of the oft-repeated declaration that it has no real right to exist. Yes, maintains itself and grows bigger and bigger every year in the cotton trade, no matter whether cotton speculation waxes or wanes. It is because of the unrivaled facilities of New York for handling a world-wide credit business, and because of the unequaled experience, skill and probity of the active members of the Exchange in conducting such a business. During these past years of violent speculation and remarkable fluctuations in the price of cotton, no customers of any firm in the New York Cotton Exchange, except those who for a few months placed their accounts with a notorious plunger, have lost one dollar through the failure of the firm's guarantee of the credit of the market. These customers have been scattered over the entire face of the globe, from San Francisco clear round to Shanghai. All have found their contracts on the New York Cotton Exchange absolutely good, down to the last cent. As I stand day after day on the floor of the Exchange, fulfilling my little part in the great whole, it often seems to me that I am in the very heart of the world, so far as cotton is concerned. All roads lead to Rome. All the arteries of the cotton world lead not merely to New York, but to the very floor of the Cotton Exchange. Who can suppose that these vast facilities, this wise conduct of the business, this unblemished reputation for probity and for giving every man his just due, whether he be citizen or foreigner, can fail to make the New York Cotton Exchange ever more essential to the welfare of the commercial world?

Southern Development and American Deep Sea Shipping.

BY D. A. TOMPKINS, Charlotte, N. C.

It would be extraordinary if a country could first be developed as one of diversified agriculture and manufactures with white, free labor, and then be transformed into one of agriculture only and with black slave labor, and not radically change its principles and political economy. The political principles which fit one of these conditions could not possibly fit the other.

The South was first developed as a land of diversified interests in agriculture and manufactures. Her very intelligent and initiative farmers once made indigo a staple crop. The introduction of cotton from the West Indies was a wonderful initiative movement and the subsequent development of the crop to proportions which make the products of the cotton plant one of the principal supplies of food, clothing and shelter in the world, is an economic achievement unsurpassed, yes, unequaled by any other people in the world, not only in this time, but in any time concerning which there is any history.

In the first fifty years of cotton production the price averaged over 17 cents a pound and went as high as 44 cents as a normal proposition of supply and demand. Prices were good enough to make everything else give way to cotton production. All slaves available were bought. The slave trade was tremendously stimulated and was a brisk one in the early days of cotton production.

Under such an influence a well developed manufacturing interest and an important commerce which had been developed in the South with free white labor were well nigh dried up. A large proportion of the free white labor went to the then frontier Northwest—to Ohio, Indiana, and Illinois.

Before cotton production with slave labor (tobacco, rice and sugar found slave labor advantageous also) became the dominant influence in the South, many Southern statesmen favored protection for American manufactures, and fostering legislation for American ships. President Madison is credited with having done more for American shipping than any other American. Mr. Calhoun was himself a protectionist until he tied up his political fortunes with the institution of slavery. The principles of political economy which fitted diversified agriculture, manufactures and commerce with free white labor, did not fit that agriculture which was based on the cotton crop alone and with slave labor. At present we have no slavery. Diversified agriculture, manufactures and commerce are reviving and we need now a political economy which fits the new conditions.

Nothing has ever been so advantageous to an agricultural population as the revival and development of manufacturing has been to the farmers of the South. This development has drawn people enough from the cotton fields to relieve excess competition, it has made cash markets for perishable products of the farm and has more than doubled the price of the staple crop—cotton. A ten-million bale crop formerly yielded for the farmer less than $300,000,000. The same crop now brings more than $600,000,000.

The cotton mills have been most instrumental in bringing about this most beneficent change. The investment in cotton mills is approximately $200,000,000. Therefore a permanent investment of $200,000,000 has added $300,000,000 to the annual income of the farmer for his cotton and at the same time markets for his other crops.

It is self evident that it would have been immensely advantageous if some action could have been taken that would have stimulated the present factory development in the ten years succeeding the Civil War, instead of forty years required without any stimulation. The cotton farmer might well have paid fifty cents a bale on cotton, to have

been given as a bonus to stimulate factory construction. If this had been effectively done the Southern farmer would have escaped twenty-five years of the poverty which he had to spend before the modern industrial development gave him relief.

Great as has been the advantage of manufactures, the half of what is possible has not yet come. In the first fifty years of cotton production in America the price averaged more than seventeen cents. With proper policies of political economy this average price may be brought about again and maintained.

We have now so developed our manufacturing interests that our need now is extended markets for our manufactured products as well as our farm products. We need now an enlarged export trade. In order to get it we must have American ships upon the high seas.

A MERCHANT MARINE.

A hundred years ago, before slavery became dominant, the Southern statesman favored American shipping interests. Madison did more for American shipping than any other American statesmen. In the early days of the republic American ships carried 90 per cent. of American deep sea commerce, now our ships carry less than 10 per cent. South America takes millions of dollars worth of cotton goods. We furnish less than 3 per cent. of it. England, Germany and France are willing enough to send subsidized ships to our ports for the cotton, but not for our cotton goods to take to markets which those countries control. Even our cotton oil goes in bulk to France and Italy to be prepared there for its ultimate markets. We refine it in this country as well as they can and we do refine it for our home markets, but we have not the ultimate foreign market because we have no ships.

During the time of slavery we had little except farm products to ship from the South. For these we could afford to depend on English and other foreign ships. But now we must abandon policies which fitted slavery and adopt new ones fitted to free institutions and diversified pursuits. We need ships now as badly as the farmer needed factories in 1880. We must have them if we would escape a depression like the farmer had when cotton went to five cents a pound.

We not only need ships to extend our commerce abroad, but we need them to supplement our navy. In time of war fighting ships are not all of a navy. There is required a transport service for men, ammunition and supplies. There are also required seamen to handle the transport ships. Therefore it becomes feasible for the general government and the merchant to go into partnership and build ships for commerce in time of peace and for transports in time of war. This would give the navy two important strengthening arms; viz, ships for transport and seamen to operate them, always ready.

We are building the Panama Canal at a probable cost of $200,000,000. For whose benefit? Not ours unless we do something to get American ships. England collects annually between $600,000,000 and $800,000,000 for deep sea freight, as much as we do for our cotton crop or wheat crop. We pay England annually $200,000,000 deep sea freight money. England pays more than $10,000,000 annually in subsidies to keep her shipping interests protected.

The bill proposed in the last Congress carried subsidies which could not have aggregated over $3,000,000 if all the lines proposed had been established. England could not have won the South African war except for the aid of her merchant ships and transports.

General Questions of Cotton Mill Fires.

BY CHARLES H. FISH, Dover, N. H.

It does not take a long apprenticeship or connection with the cotton manufacturing before one is introduced to the cotton mill fire, in some of its various forms. The general character of the work invites fires. There are more fires, large and small, in the cotton mills than in any other business, aside perhaps from those where dangerous chemicals or explosives are employed in the processes.

The causes are many. First, we have every opportunity for fire from friction. This friction may come from some of the numerous bearings on shafting or machinery, or from the rubbing of belts against woodwork, or maybe from the friction caused by foreign bodies passing into or through the machines with the stock. Then there is spontaneous combustion, always possible, in one form or another, although in the modern mills where cleanliness is maintained, the chance for spontaneous combustion is greatly diminished. Then there is the carelessness of employes, a factor of considerable importance. Matches will find their way into the vulnerable spots, causing trouble; an argument in favor of the use of safety matches only, in and about the mills or tenements of its employes.

Of the many fires occurring in cotton mills, a large percentage of them actually arises from unknown causes, although usually a cause is assigned. Hardly a day passes without its list of cotton mill fires, more or less serious, and new causes, or reasons, for them, not before given, are constantly appearing.

With the conditions which invariably exist in cotton mills, although in some departments to more extent than in others, the fire must be under control immediately, or great damage may result. We are all familiar with the inflammable quality of cotton fiber, especially when in light or fluffy condition. We all know what a delight oil soaked floors and woodwork must be to the devouring elements. At the same time, those of you who have been fortunate in having only small fires, confined maybe to an individual machine, easily and quickly extinguished with a pail or two of water, may have, I am free to say, an entirely wrong idea of what a serious fire in the cotton mills means to those who are unfortunate enough to be brought directly in contact with it. It is a well known fact that a fire in a bale of compressed cotton cannot be easily extinguished, largely from the fact that it is difficult to get water onto that part, or all parts, of the cotton which is on fire. As far as the water reaches, it does its work instantly and effectively, but no matter what force the stream of water may have, it cannot penetrate a compressed bale of cotton, nor can it penetrate to any distance a pile of loose or opened-up cotton as found in the opening rooms. Bales of cotton which have fire in them can be sunk under water for hours without extinguishing the fire,

which breaks out again as soon as the cotton is opened to the air. The same characteristics, in a less degree, apply to oil soaked beams and general woodwork, after they have once become thoroughly heated. If a fire once extinguished would stay extinguished, the difficulties of the situation would be largely removed.

In following out my subject it seems allowable for me to be as specific as I please, and for illustration I take the liberty of reciting briefly the history of a fire which badly wrecked No. 1 Mill of the Cocheco Manufacturing Company at Dover, New Hampshire, on the 26th day of January, 1907.

This mill was a five-story brick mill of modern construction. The main mill is 400 feet long, 74 feet wide, and five stories high. Running directly back from the centre of the main mill was an ell four stories high, 200 feet long and 74 feet wide. In the main mill the two lower floors were filled with looms, the third floor with carding machinery, the fourth floor with ring spinning frames, and the fifth floor with mules. In the ell, the first floor contained the engine room, and back of it the opener pickers; the second floor contained looms, the third floor carding machinery and finisher pickers, and the fourth floor slashing, spooling and warping. The roof of this ell came just under the fifth floor window sills of the main mill, making a splendid fire escape from the mule room through nine windows, covering the entire width of the ell. The mill had wooden posts throughout, of ample size, with the usual cast iron caps and pintles. Double floor beams were used entirely, each made up of two beams, 7 inches by 16 inches, bolted together but separated by blocks or washers about 3/4 of an inch thick. This made a space in the centre of every double beam, at least 3/4 of an inch wide, and 16 inches deep or high, but owing to the shrinkage of the beams, these open spaces were often considerably more than 3/4 of an inch wide.

The ell was divided from the main mill, on every floor, with a brick wall with fire doors, but this wall was cut through in several places by wide belt holes where the main belts from the engine passed through to the head line shafting in the main mill. There were four towers, two on the front and two on the back, each 25 feet square, with wide stairways in three of them, and an elevator in the fourth. There was also a wide stairway at the end of the ell connecting with every floor, and a fire escape on the outside connecting from the roof to the ground. The sprinkler system covering the entire mill was divided into three sections, two of these sections, of equal size, covering the main mill, and the third taking the entire ell. Each section was independent of the other and was controlled by its own one valve, these valves being located in the hallways on the first floor.

There were six stand pipes, one in each of the four towers, one at the centre of the mill, and one at the end of the ell, each with hose connections on every floor. The city water pressure, which was always on the mill, had a standard pressure of 110 pounds. In the pump house at the rear of the mill was one Blake fire pump of 1,200 gallons capacity, supplementing the city pressure on the hydrants in the immediate vicinity. In addition to the nine mill hydrants, there were six city hydrants, which were in use throughout the fire. Connecting with the No. 1 Mill system, there were two large rotary pumps driven with the water wheels in No. 2 and No. 3 Mills, and a 1,000-gallon Worthington Underwriters' fire pump at No. 10 Mill, all of which did good work at the time of the fire, the No. 10 pump having a record of 58 hours' continuous service against 170 pounds water pressure, running at maximum speed for the entire time, with the exception of a few minutes when it was slowed down on account of the slacking up of the water supply. There was also, in addition, a 500-gallon underwriters' pump in continuous service from the plant of I. B. Williams & Sons, located nearby.

The above facts are given merely to picture in a general way the physical conditions as they existed when on the morning of Saturday, the 26th of January, a fire broke out in the centre of the card room on the third floor. The weather conditions at the time were extreme, the thermometer outside ranging in the vicinity of 25 degrees below zero, in fact at no time during the fire did the mercury get above the zero mark. This intense cold, coupled with the fact that double beams were used in the construction, is responsible for the extent of the damage.

On the morning in question the mill started at the usual hour, ten minutes past six o'clock, and shortly afterwards a sprinkler head on the fourth, or spinning room, floor went off for some cause unknown, possibly from a defective head, or possibly on account of some injury received at some former time, in the way of a blow or shock, which started the solder. Promptly in accordance with instructions the overseer of this department ordered the sprinkler valve controlling this section of sprinklers shut off, and the drip opened, in order to quickly drain the pipes, and then proceeded with all haste to take up the water which covered the floor, to prevent it running through onto the machinery below. While the men were engaged in this work, they suddenly detected smoke coming up through one of the large main belt boxes. This belt passed through the card room below but was boxed up to a height of only six feet from the floor. Looking down through the belt box, fire was seen running over the tops of the cans of drawing. Here is a strange coincidence, that a fire should start in one department, within not over three to five minutes after the water was shut off from the sprinklers for a minor repair in another department, but this is the fact. The real cause of the fire will never be known, although several theories, more or less plausible, have been advanced. From the testimony of some of the witnesses, the fire seemed to start from one of the main belt boxes. The location of the sprinkler head which went off in the spinning room was such that this main belt may have become wet, causing it to slide or slip sideways on the pulley, until it touched the woodwork of the belt box, starting fire from the friction.

To return to my story. The overseer and the employes in the card room, innocent of the fact that the water was shut off the sprinklers, did the best they could with fire buckets, and a line of hose from the stand pipe, wondering all the time why the sprinkler heads did not operate, but they were quickly driven back by the rush of flame and smoke. In the meantime, the overseer in the spinning room above, after discovering that there was a fire below, rushed down to the main valve and it

was opened as promptly as possible. There was some delay here, however, owing to the crowding of the operatives through the hallways, they having already received warning and were hurrying out. The spread of the fire was so rapid through the card room that a large portion of the sprinklers in this room was melted off, making so many openings that when the water was turned on, the pressure in the mains was greatly reduced, interfering with the efficiency of the sprinklers. Shortly after the writer's arrival at the mill, which was within five to seven minutes of the starting of the fire, the pressure in the mains showed on the gauge less than 60 pounds. In the meantime, the fire was forcing its way through the rest of the card room, opening all the sprinkler heads in the other section, and quickly finding its way into the ell, through the belt openings, it passed down the belt boxes to the main engine room below, melting off sprinkler heads everywhere with impunity, until finally, in order to make the hose streams available, the sprinkler system had to be abandoned, all valves being closed tight.

From this time on the progress of the fire was marked by a series, or succession, of unusual incidents and annoying situations, many of them I think up to that time unknown or unnoticed in the history of mill fires. In spite of this fact, however, you must remember that nothing occurred in connection with this fire which could not be repeated under similar conditions and at any time, in any cotton mill or manufacturing establishment, no matter how situated or how well equipped: this is particularly so if in the construction double beams, with open spaces, have been used in place of the single or solid beam. It is always easy to criticise and to make suggestions as to what best be done to prevent something which has already happened. It is the old story of the barn door and the horse, but it is an ill wind that blows nobody good and I believe that the lessons of this fire will in time go a long way towards preventing its reoccurrence.

To begin with, no one ever had more reason to feel that their property was secure from fire than had the managers of the Cocheco Manufacturing Company to feel that their No. 1 Mill was immune. Repeated inspection by the Mutual Insurance Companies had reported the mill and its equipment as "Excellent." Aside from the corporation's own equipment, there was a very efficient city department, with its central station within a few hundred yards, where there were two fire engines, and what was supposed to be an unlimited supply of hose.

But to return to my story. I will ask you to go back a bit and picture, if you please, this large mill, at starting-up time, with the operatives in their positions and the work straightened out for the morning's run. We are in the card room, when, suddenly, and without warning, tongues of flame are seen leaping from the centre of the room in all directions, traveling with lightning rapidity over the tops of the open cans of loose cotton and leaping from frame to frame with the greatest ease. Although there is excitement, there is no confusion, published newspaper reports to the contrary, and the employes quickly pass out through the four ready exits. In the meantime a thick smoke, a sure messenger of danger, has passed up through the belt boxes and belt holes into the rooms above. In a moment word is sent to every department and the operatives are warned. In the mule room on the upper floor we find the boys and men, ranging from sixteen years old upwards, mostly active and indifferent to danger. They have been in cotton mill fires before and are interested rather than excited. The overseer of this department and his second hand pass through the room, systematically, and warn them all that there is a serious fire in the card room and the orders are to leave the mill. It is interesting to state here that this second hand was later taken down from a window, with others who had stayed too long and who, when without warning a great wave of choking smoke and fumes swept through the room, had become bewildered and rushed to the windows, forgetting the escapes to the ell roof, and forgetting also the hallways, past which nearly all must have gone. On the other hand, there were some who passed out with the others to safety but who returned for their coats, or other clothing or belongings, and were overcome. It is a sad fact that of the four who lost their lives in the building, three went out of the mill safely at the first alarm and were seen in the mill yard, or in the street, and had returned into the mill, presumably for their clothing.

Time or space will not admit of a more detailed description of this fire and I pass on to draw a few conclusions which the experience suggests. I cannot but appreciate the fact that many of you may feel that suggestions from me are superficial or possibly out of place; at the same time, I content myself with the thought that there is no great loss without some gain, that the gain in this case must come from the lesson taught, and whether the teachings are accepted or not is a matter beyond my province.

To begin with, I believe that the facts will warrant the sweeping statement that, generally speaking, but few cotton mills of this country are particular enough in matters of detail connected with the fire apparatus, and the organization of the fire department. The careful inspections made periodically by the inspectors of the mutual insurance companies are all right as far as they go and without them there is no knowing to what extent our indifference in these matters might lead us.

In this connection, I would say that I believe each individual mill, where it is possible, should be controlled by one main valve, situated well outside of the building and marked plainly with an indicator post. No underground valves, marked or unmarked, requiring a wrench should be allowed. Inside of the building each floor, or each section, dividing as it seems best, should be controlled by its own valve located outside of that department, preferably in the hallways. The location of these department valves is most important. There is the one objection to locating them within easy reach that they may be tampered with by unauthorized persons. Again, there is the serious objection to locating them out of reach so that a ladder or steps of some kind are required. Again, it is a mistake to locate these valves where the steps or ladder used as a means of getting at them come in direct route of the people coming out of the mill.

At the time of the Cocheco fire, the main shut-off valve, shutting off one-third of the entire mill, as explained, was located in the lower hallway, at a convenient height from the floor, where it could

be handled readily without the use of steps. At the first alarm of fire the crowds of operatives, who hastened down the stairways and out through this hall, interfered seriously with the two men who were opening the valve. The plan which has been adopted in the new mill locates these valves high up, out of the way, and an iron walkway is constructed and permanently fastened under these valves, at a convenient height for operating them, this walkway being reached from the floor by an iron stairway located in the hallway outside of the course of travel.

All inside valves should be outside screw and yoke, or so called rising stem, valves, discarding entirely the ordinary form of gate valve, which you can never be sure of as being open or shut without trying it, and then we may run into the most annoying uncertainties caused by the occasional introduction of a valve of the opposite hand. The left hand valve is certainly an invention of the Evil One and it has done much toward developing the profanity of mankind. In the use of these valves, as to the closing and opening of them, little can be said beyond the warning which has already been sounded so vigorously by the insurance companies, to the effect that no valve should be closed without some responsible man being left at the valve to open it immediately in case of necessity. I believe, however, that we should go further than this and establish a fixed rule that whenever it becomes necessary to close a sprinkler valve during working hours the overseer or foreman of every department in which sprinklers are put out of commission must be notified. Even with this precaution, it would seem as if the closing of a sprinkler valve, especially while the mill is running, was an act to be avoided by every reasonable means. In the case of the Cocheco fire, I do not believe that had a man been stationed at the valve the results would have been materially different, unless the overseer or the second hand in the card room below had been notified at the moment the valve was shut. It may be that valuable time would have been saved had it been known in the card room that the water was shut off from the sprinkler heads. Certainly a risk is taken when a main valve controlling any portion of a mill is shut off. If a fire starts, especially in the card room where there is any amount of loose cotton, it might gain such headway during the time taken to give the alarm and to roll the gate open that the efficiency of the sprinkler service, by the reduction of pressure, would be greatly impaired, if not entirely ruined.

A few years ago but little attention was paid by the insurance companies, or by manufacturers, to the subject of stand pipes. At one time I understand they were considered by many as being of little value, and their discontinuance recommended. I think I am right, however, in stating here that this opinion is rapidly changing. From my own experience, I believe that stand pipes are next in importance to the sprinkler head, and that stand pipes of ample size should be located in every tower with hose connections in the hallways, and stand pipes also in the centre of the buildings, especially where the buildings are large in extent, with a good supply of hose immediately available. The only chance of checking a large fire is by getting close to it with powerful streams. The stand pipe brings the water, in a most convenient way, to every floor, saving all the time which would otherwise be consumed by the dragging of hose up the stairs or up ladders raised on the outside of the building. Under no consideration should we abandon the stand pipe system.

Another piece of apparatus which has received but little general attention is the Chemical Fire Extinguishers. It was fortunate for those who were struggling with the Cocheco fire that they had at hand a good equipment of chemical extinguishers. For some years past I had personally believed in their efficiency and had from time to time added to the numbers in use about the corporation, until many of the rooms where a fire was likely to start were equipped with them.

The fire pail, on account of its cheapness, its extreme simplicity, and at the same time its comparative effectiveness, perhaps should be placed first in the list of factory apparatus, but the fire pail has its limitations in more ways than one, and it is at some of these points that the chemical extinguisher comes into play. You can, with the extinguisher, throw a most effective, although small, stream against the ceiling or into nooks and corners or out of the way places, where it would be impossible to throw water from a pail. I believe the time is coming when the chemical extinguisher, with possibly some improvements over its present form, although it is now pretty satisfactory, will have an important place in every mill department.

It is unnecessary to comment on the advisability of ample and well located supplies of fire axes, bars, spanners, lanterns, etc. It goes without saying that without these you are liable to find yourselves in a most uncomfortable position.

MILL CONSTRUCTION.

Leaving the subject of apparatus thus incomplete, I wish to call attention to a few points in mill construction which are brought out in the following of my subject.

Belt Towers.—The running of main belts from the engine room up through a mill building, no matter whether it be at the centre of the building or at the end, is without doubt bad practice, speaking from the question of fire protection. The rapidity with which fire will travel, up and down, through belt boxes, is surprising. At the Cocheco fire, the engine room had fire in it a very few moments after it was discovered in the card room three stories above. The rapid spread of the fire from room to room was without doubt due to a great extent to the openings in wall and floors, made necessary for the passage of the main belts. Construct your belt tower wherever it seems best, but build it fire proof and have it entirely cut off from the rest of the building. There should be no openings from the engine room through which a fire might pass into the mill.

Tinned fire doors are almost perfect protection against the spread of a fire. At the Cocheco fire not a single door failed to do its duty. They will get out of repair, as regards the running parts, usually the morning the insurance inspector arrives, but otherwise than this they are most satisfactory. An ordinary sheathing partition, supplemented by a stream of water, is a valuable fire retardent. A temporary partition across the end of the card room stopped the spread of the fire in that direction.

The subject of column caps or plates deserves a moment's attention. It seems to be general practice to use for a column cap on which the floor beams rest, a cast iron plate of considerable length. In the Cocheco No. 1 Mill these plates were 24 inches long and about 14 inches wide, the width of the beams. The overloading of the floor beams on the lower floors by the wreckage and ice, deflected them to such an extent that a great weight was brought on the ends of the plates and many of them were broken. There certainly can be no reason why a long plate should be used as it can add nothing to the strength of the building. A column cap should be only sufficiently long to cover the column or post with enough additional length for the lag screws or bolts holding the timber. These caps of which I speak were fractured square across the centre, or directly over the centre of the column. These were of good design, being about 2 inches thick on the ribs.

There is nothing to be said against the wooden column, and in case of fire, I believe it is much safer than the iron column. The wooden column charrs easily but burns away slowly. The floors fall a long time before posts have become sufficiently charred to weaken them materially.

As to the question of floor beams, I have already given you my opinion of the double beams construction. It is practically impossible to describe briefly the difficulties encountered during the Cocheco fire on this account. The open spaces between the two timbers formed a safe retreat or abode for the fire and also furnished a ready and safe means of travel from one side of the room to the other, or in a number of cases, through the medium of the posts the fire would travel from floor to floor, as well as from side to side.

It was practically impossible to extinguish fire in the beams without getting under it so that the stream could be directed squarely into the open space From any location except directly beneath the stream of water, no matter how powerful, had little or no effect, as it could not get at the fire. It is readily understood why these beams, when greatly overloaded with ice and water and the wreckage from above, could stand but little of such treatment before they gave way. During the progress of the fire these beams broke down continually, making work inside of the building extremely dangerous.

Those of you who have buildings constructed with double beams are facing this danger, and some practical methods should be devised for at least remedying in part this evil.

At Cocheco we are now experimenting with the filling of the space with a cheap grade of common cement. A batten strip is first nailed along covering the opening on the underside of the beam and then the space is filled with cement grout, poured down through holes bored in the floor above. I hope some better way will be devised, however, as this is a rather slow and laborious process, necessitating the boring of many holes through the floors. The fastening or dogging of floor beams to the brick walls is also to be avoided. It is a remarkable fact that although every beam in No. 1 Mill was securely fastened to the walls by irons imbedded in the brick work, in every case the beam in falling either pulled the irons clear from the beam, or tore the fastening away from the brick work without doing material damage to the walls themselves. The fact that the brick walls stood so well goes to prove conclusively that this mill broke down rather than burned down.

Much could be written upon the organization and training of the cotton mill fire brigade, but I will touch on this subject only as far as to say that the men who have to fight the cotton mill fires are those who happen to be on the spot at the time. During running hours the problems are far different from those presented by a blaze in the night. It is the man with the good head and reasonable amount of common sense who makes the best mill firemen, after all. Nine-tenths of the battle is won when ample apparatus, all in good condition, is available, together with a few steady, active fellows who will keep cool and obey orders.

Confusion is the one thing to be avoided. It is also the one thing which invariably occurs to more or less extent. The value of the fire drill is that it disciplines the men, and discipline is the surest preventive of confusion.

Production and Manufacture in the United States.

BY S. N. D. NORTH,
Director of the United States Census, Washington, D. C.

It may be fit that I present on this occasion some phases of progress in the growing, handling and manufacturing of cotton in the United States, which have been brought to my attention through the work of the census office, with whose investigations I have been connected for more than twenty years. This work throws much light upon present conditions, and enables us to forecast the future, in certain directions, with some degree of assurance. At no time in my experience have the evidences of progress in cotton production and manufacture been so abundant and significant as now.

The presence of this large delegation of European manufacturers and the purpose of their visit here, possess a significance impossible to exaggerate. We interpret it to mean in the first place the acceptance by Europe of the fact that the United States must continue to be the chief source of supply for staple cotton; that all other sources, real, prospective or imaginary, are relatively of little consequence. Your visit will convince you that the resources of the Southern States are sufficient to meet all demands which the present generation can foresee.

The efforts to locate and develop new cotton growing areas, with a view to reducing the dependence of European spinners on America are not, as I see it, to the disadvantage of the American cotton growing industry. These endeavors are prompted by a natural business sagacity which looks to an increase in the sources and, if possible, in the quantity of raw material annually available. From the standpoint of the American cotton grower, this should be welcomed, for it will be a long time, if ever, before a perceptible percentage of the world's crop is secured from these sources, and the experience gained by the promoters of these foreign endeavors will give them adequate knowledge of the hard labor and expense necessary to grow cotton and teach them to appreciate the demand of the American cotton producers for proper returns for their labor. The

object lessons which will be given in ginning, baling and handling cotton at your model plants will be beneficial in instructing us as to your requirements. The American cotton grower is in the position of the progressive tradesman who courts competition, for he realizes that all the odds are in his favor and nothing but benefit can come to him.

Thirty years ago Mr. Edward Atkinson, our first student of the economics of cotton, declared that the whole cotton crop of the globe could be grown on about two acres out of each one hundred of the Southern cotton belt; and through the present wisely utilized extensive system of culture, our cotton producers are rapidly realizing this fact. For example, between 1879 and 1906 the cotton acreage of the United States increased 121 per cent. while the production increased 166 per cent.

In 1906 Texas produced more cotton than was grown in all the South in 1870; and we shall see her crop double in ten years, as it has doubled every ten years in the last thirty. We are about to admit the 46th member of the sisterhood of states comprising the old territory of Oklahoma and Indian Territory, with an area of 70,000 square miles and a population revealed by the special census just completed of 1,400,000 people. In 1880 no cotton was grown there. This year the new state will grow a million bales, and in ten years' time her production will exceed that of any one of the original cotton states.

In the second place the presence of these foreign delegates crystallizes the first definite, intelligent effort to bring the producer and the consumer of cotton into that friendly, co-operative relation and understanding essential to the best interests of both.

The time is most opportune. This is a period of very rapid evolution in the whole range of the cotton industry, due partly to the times in which we live, and partly to the stimulus of government co-operation. The South is just awakening to her heritage. I venture the prediction that at the next census and at each succeeding census for a long period, the Southern States will show a greater relative advance, both in agriculture and manufacture, than any other section of the United States.

Some of the tangible evidences of advancement may be indicated:

1. The tendency towards consolidation in varied lines of endeavor.

In the past seven years there has been a marked tendency to consolidation in ginning. New and modern establishments have very rapidly supplanted private and poorly equipped ones. The statistics of the number of ginneries operated during the season no longer reveal the condition of the industry clearly, for as the active ginneries decrease the gins and machines and the saws operated increase. The census office last season made a canvas which showed that upland cotton was ginned in 28,486 ginneries, which contained 54,553 gin stands or machines, with a total of 3,597,400 saws, an average of 126 saws to an establishment.

Twenty-five years ago there were not less than 45,000 ginneries with 50,000 gin stands, of an average of 60 saws per plant. Thus, notwithstanding the fact that the crop has been increased 99 per cent. the number of establishments has been reduced at least 30 per cent. The equipment of these modern establishments has been doubled both in machinery and in effectiveness. During the season of 1906-7, more than 26,000 ginneries were operated with steam as the motive power; 2,000 with water; 587 animal power; 147 gasoline; and 49 electric power. A quarter of a century ago a very large percentage of the ginneries were operated by animal power.

It may be noted that the round bale is not an increasing factor in this evolution. The highest number of round bales reported to the census was 981,264 in 1902. The number reported last year was 268,219 and the decrease has been in a steady ratio. Without expressing any judgment regarding the round bale, it may be said that its failure to make progress is largely due to the methods adopted to promote its introduction.

I predict that the next great advance in the evolution which is taking place in the handling of lint cotton, will be the supplanting of the present preliminary and somewhat loose form of packing by the general introduction of gin compresses. The rapid consolidation occurring in the ginning industry, and the increase in financial strength, will enable ginners to give attention to baling equipments. Among the desirable results to follow the establishment of cotton compressing at the ginneries are: (1) The saving of the subsequent compress charges, which last season amounted to not less than $5,000,000. (2) From the present loosely compressed packages the fiber is easily removed, and it is estimated that not less than $1,000,000 worth of lint, in a crop of 13,000,000 bales, is removed or lost from the bales in their course from the gin to the consumer. (3) If the bales are compressed and wrapped once for all at the point of origin, the charge of extra tare, frequently made against the compressers, will largely be avoided and the package be much neater and better protected throughout its entire transit.

2. The second evidence of advancement in the cotton industry is the development in the last few years of the cotton seed industry and its influence on the ginning of cotton. Fifty years ago the problem of disposing of cotton seed as a refuse in localities where it was not required for fertilizing, without injury to the public health by the pollution of streams, demanded solution by prohibitive legislation. Today the utilization of this by-product adds approximately $100,000,000 to the value of the crop. Fifteen years ago the value of cotton seed was about $6.00 per ton; today it is selling at three and one-quarter times as much.

With the increase in the cotton seed industry, competition for seed has become so sharp that the oil mills have realized the necessity of erecting ginneries and reducing the cost of ginning to the minimum, with a view to attracting seed cotton, thus enabling them to come in close purchasing contact with this raw material.

The mills equipped with modern facilities for handling and ginning seed cotton, experience little difficulty in convincing the farmer that they save delays, which naturally result from patronizing the older and slower methods of ginning and baling. The product turned out from these modern plants is a splendid object lesson on improved methods of preparing cotton for market.

3. Another factor is the evolution through which the cotton industry is now passing, and which will largely determine the character of future methods and practices, is the widespread interest in locally storing and warehousing cotton.

The transportation facilities of the South have

not kept pace with her marvelous industrial development; these carriers are taxed to their uttermost under ordinary conditions, and during the cotton harvesting period it is impossible to move the cotton with sufficient rapidity to avoid deterioration from exposure to the weather.

The producers have realized that if they are to get the full value of their product they must not attempt to market a year's supply in four months, as heretofore, but must deliver as the demand requires. They understand that the manufacturers prefer not to carry the storage, interest, and insurance charges incident to large stocks, and that it is best for the producer to hold these stocks, and, as far as practicable, to eliminate those middle men who have not in mind the mutual interest of producer and consumer.

4. The spread of the cotton manufacture through the Southern States, which brings the planter and the manufacturer face to face, also works powerfully to the same end. The needs and difficulties of the user of cotton are thus brought home to the grower by daily practical contact. This contiguity is working for the eradication of the old feeling, once almost universal, that the manufacturer is the natural and inevitable enemy of the planter. Side by side, with common interests, with mutual sympathies in all that makes for community advancement, they are able to discover each other's need and trials, and their allied endeavors will greatly help to overcome common difficulties in a way not possible under former conditions.

5. Another important factor in this evolution in cotton production, is the systematic work of the Department of Agriculture, in the scientific investigation and improvement of the plant; in the teaching of new methods of cultivation, of the proper use of fertilizers, of new and improved varieties, of dealing with the boll weevil and other pests; of intelligent rotation and diversification of crops, so as to make each farm a self sustaining entity; of the general methods of getting the best results from all the natural conditions. It is impossible to overestimate the improvement which is gradually taking place as a result of the work of the Department of Agriculture, under the inspiring guidance of James Wilson, the best and most helpful friend the farmer ever had, in this or any other country.

6. A sixth factor in this evolution is another branch of governmental co-operation; that which has to do with the statistical side of cotton culture and manufacture. I here refer to the work of the census office.

Prior to 1900 the cotton work of the census was confined to decennial canvasses of the growers, for statistics of acreage and production, and of the manufacturers, for statistics of the consumption of cotton, the general character of products manufactured, and of their equipment. For interdecennial years, statistics of the cotton crop consisted of estimates, and those compiled from the cotton movement. Under the commercial system, it is impractical to segregate the cotton according to the year of growth; to distribute the crop by the localities producing it; and to fix the exact volume until the close of the commercial year, when practically the entire production has passed from the hands of the growers.

It has long been urged by students of cotton statistics that a count of the bales at the ginneries would afford reliable statistics as to the quantity of cotton annually grown. To test the merits of this system, the director of the census in 1900 instructed the enumerators to visit every cotton ginnery and obtain a report of the quantity of cotton ginner from the growth of 1899. The statistics so obtained were found to be in close harmony with the commercial figures. Congress was impressed with the practicability of the system, and in the act creating a permanent census, approved March 6, 1902, the director was instructed to annually collect statistics of cotton production as returned by the ginners, and to publish bulletins at frequent intervals during the ginning season. To secure prompt, trustworthy, and thorough service, it was found necessary to appoint and compensate local special agents in every cotton producing county. The field work has been annually enlarged and perfected. The field force now consists of 724 agents charged with the duty of personally canvassing the cotton ginneries for ten reports during the season.

You will observe that the census system is a count and not an estimate or a guess. It enables the office to trace every bale of cotton that goes from a ginnery to the market.

I will name some of the advantages of the system:

1. The periodical reports during the ginning season, when compared with similar statistics for a series of years, afford valuable aid in arriving at the probable volume of the year's cotton crop.

2. The final report issued in the early spring supplies definite knowledge of the volume of the crop five months earlier than the system which measures the crop by the commercial movement. This is valuable information to the manufacturer, and serves as a guide to the producer also, as it enables him to estimate the possible demand for cotton in the future, and to regulate his acreage for the succeeding year accordingly.

3. The distribution of the cotton crop by counties affords a more reliable basis for comparisons, and gives to all concerned a means, not otherwise possible, of analyzing the crop statistics.

4. The statistics are reduced to equivalent bales of 500 pounds, thus affording a degree of accuracy for comparison not otherwise available.

The most confusing element in cotton statistics is the numerous standards of bale weights. Some statisticians employ the 500 pound bale, some use varying estimated average weights of the several countries contributing to the annual supply, while still others reduce these varying weights to a uniform standard of 400 to 500 pounds. The commercial figures are stated in terms of the estimated average of each crop, which varies as much as ten pounds in different seasons, and frequently even more for the individual states. A variation in the bale weight of ten pounds in crops amounting to as much as 13,500,000 bales, produces a variation in measuring the actual quantity grown, of 270,000 bales, when reduced to 500 pounds.

The census office has from the start reduced its returns to equivalent 500 pound bales, thus supplying consistent comparisons in county, state and United States totals. To illustrate the value of this, the average weight of the bale reported as ginned in North Carolina in 1906 was 474 pounds compared with 516 in Mississippi and 527 in Texas. An even more striking illustration is found in comparing production by counties. For instance,

the average bale weight for Bolivar County, Mississippi last season was 555 pounds, compared with 441 pounds for Wake County, North Carolina.

It is not until the statistics are reduced to a common basis that accurate comparisons are possible, and the standard of 500 pounds nearly approaches the average weight of the actual bale, and is an ideal package for statistical purposes.

Because of the fact that many ginners do not weigh the baled cotton turned out from their establishments and that some of those who do weigh it fail to keep permanent records, average bale weights secured from ginners are not always reliable. In view of this fact, and of the necessity of securing local weights in order to credit each county with its proportion of the crop, the bureau has its canvassing agents secure bale weights from the records of public weighers, merchants, and other handlers of cotton in their respective counties. The number of square bales for which weights were returned for the crop of 1906 was 4,682,269, reported from 769 of the 853 cotton ginning counties. The counties from which individual bale weights were not returned ginned less than 2 per cent. of the total crop. These weights were returned in three installments, with the reports of cotton ginned to October 18, to December 13, and to January 16. By securing the records of weighers for different periods, statistics were secured representative of the varying conditions of the season. I cannot conceive how a more reliable system can be devised for computing bale weights.

The agents are given six days in which to visit the ginneries and secure returns of cotton ginned. Summaries of these are wired to the bureau on the last day of the canvass. On the day following the close of the canvass, these telegraphic summaries are added and the results given to the public. The reports are printed on preaddressed cards and mailed within twenty-four hours after publication. At the time of wiring the summaries the agents are also required to mail the individual returns of the ginners, which are added in the bureau as a check against the telegraphic reports.

An important improvement has been introduced this season in publishing the results. These reports will be given to the public at 10 A. M. instead of 2 P. M.

Hereafter there will be no unnecessary waiting for results on the part of trade interests, as the reports will be announced practically at the opening of business (10 A. M.) on the morning following the day on which the canvass closes.

The publication of these reports at 10 A. M. will permit the results to reach Europe within trading hours on the day of their publication in America. This is in line with the earnest requests of European spinners of American cotton. By enabling them to trade on these reports in their own markets on the dates of publication, the fluctuations in the price of cotton and speculation in the product will be materially reduced.

Between the hours of 6 P. M., when the agents complete their canvass and compile their county summaries for telegraphing, and 10 A. M. for the following morning, when the reports are published in Washington, no business is transacted on cotton exchanges in this country, and hence under this plan no premature or improper use of the data is possible.

As a result of the semi-monthly cotton ginning reports of the census, we know more about cotton during the entire harvesting season, throughout all sections of the belt, than is known of any other commodity grown.

Permit me to give you a practical illustration of the necessity for knowing accurately the statistical situation as to cotton. The cotton crop of 1899, as returned by the ginners, amounted to 9,459,935 bales of 500 pounds, compared with 13,595,498 in 1906, an increase of practically 44 per cent. The value of the crops for the five-year period ending with 1906 is $3,168,423,569 compared with $1,529,502,325 for the period ending with 1899, an increase of 107 per cent. The average value of a 500 pound bale of upland cotton for the later period is $50.05, excluding the value of the seed, compared with $31.75 for the other period, an increase of $18.30 per bale. Where such variations are constantly occurring, definite knowledge is absolutely essential to stability and security.

The gradual perfection of the methods of this ginning census has been followed by the complete elimination of speculative estimates of the size of the crop, as a factor in fixing the price. It has, therefore, in my judgment, exerted a more potent influence in reducing speculation in the staple, and in preventing violent and fictitious fluctuations, than all other causes combined. It counts the crop at the gins, before the cotton has passed from the hands of the producer, and has proved of the utmost value to the grower, in arming him with knowledge upon which he can base a correct judgment as to the prospective value of his crop. It is equally valuable to the manufacturer, for it eliminates one element of the lottery in the purchase to meet future orders.

Under a joint resolution approved February 9, 1905, the director of the census was authorized to compile in connection with the ginners' report of cotton production, statistics of the consumption of cotton, the surplus held by manufacturers, and the quantity exported, the statistics to be summarized as of September 1. The first of this series of reports appeared in the fall of 1905, and we are now engaged in the preparation of the third, which relates to the supply and distribution of cotton for the year ending August 31, 1907. The statistics of these reports are a valuable check on the accuracy of the production reports and afford definite knowledge of the growth and situation of the cotton manufacturing industry in this country. They show the takings, consumption, and stocks of the manufacturers, the quantity remaining in warehouses and elsewhere, and furnish information as to the number of spindles annually operated.

Because of the fact that a large percentage of American grown cotton is exported, and much depends in arriving at the proper value of the staple, upon the quantity of stocks held throughout the world at the close of the commercial year, it has become necessary for the bureau to seek co-operation through which annual data relative to cotton stocks and consumption in foreign countries can be secured, in order to publish full and complete information relative to stocks and consumption in the world which will serve as a general guide in arriving at the possible future demand for American cotton. Accordingly a representative of the census attended the Fourth International Cotton

Congress, which convened in Vienna May 27-31 last, to explain to the Congress the methods of the office in collecting cotton statistics, and to seek the co-operation of manufacturers in securing necessary foreign data for the annual report. The result is an agreement between the International Federation of Master Cotton Spinners' and Manufacturers' Association, in which the federation agrees to collect and furnish the census information relative to spindles, stocks and consumption of cotton for practically all foreign countries. This federation has been in existence only about four years, and as it has to rely upon the mails for its returns, the census office may not be able to secure for the present all the foreign statistical information desired, but it will get whatever the federation is able to collect, and this with information obtained from other sources, will enable the office to give its reports a very extensive scope in dealing with the world's cotton industry.

Thus the progress of the harvesting of cotton is traced by the ginning returns, and the volume of the crop reliable stated therefrom in the early spring succeeding the year of growth, while the supply and distribution report aggregates as of September 1 each year the several items of the year's supply and then distributes the same so as to show the quantity exported, the quantity consumed and remaining, definitely locating the holders and the quantity of cotton held.

I will now briefly refer to some phases of cotton manufacture.

The census reports on the manufacture of cotton reveal that the industry in this country is undergoing an evolution greater and more rapid than any other, unless it be the iron and steel manufacture.

Physically the American cotton manufacture has made marvelous advance. Nowhere can be found more perfectly constructed cotton mills than have been built in the United States during the last five years.

The industry is rapidly specializing into the distinct branches which characterize the industry in Europe. There are now over three hundred mills which spin yarn for sale and by far the larger part of the dyeing and finishing is done in independent establishments. The enormous advance of the hosiery and knit goods industry continues unabated; cotton small wares have mills especially equipped for their production and upholstery goods are the exclusive product of fifty mills.

Another characteristic of our cotton industry is its resistance thus far to the general tendency to combination, so strongly developed in other industries. I do not know that this preservation of mill individuality is more marked in this country than in Europe; I do know that here it is more marked in the cotton manufacture than in any other great industry. It may be accounted for, in large part at least, by the obvious fact that the manufactured products of cotton are so multitudinous in number and so constantly varying in characteristics, that it is hopeless for any one, two, three or half a dozen combinations of mills, to hope to so fill the public demand for cotton goods, as to approximate control of the market, or eliminate the successful competition of the enterprising and ingenious individual manufacturer. The fact bears witness to the healthy state of our cotton manufacturer, and constitutes the best possible basis for the continued rapid advance of the industry.

No industrial industry has been so striking and significant as the upbuilding of the cotton manufacture to the Southern States. The economic situation which plants the cotton factory within sight of the cotton field, is irresistible. The old theory that a certain amount of humidity in the atmosphere is essential to the best results in spinning; that Lancashire in England, being the dampest spot in the world, was thus foreordained to remain for all time the centre of the world's cotton industry, was long since exploded. Modern humidifiers, which produce exactly the right amount of moisture in the spinning rooms and keep it uniform under all weather conditions, have beaten nature. There is no reason, physical or economic, why the South cannot manufacture cotton as economically and successfully as any other part of the globe.

Let us look at the situation as it stands today. In 1880 there were in all the textile mills of the South but 667,000 cotton spindles, out of a total of nearly 11,000,000 in the United States. When we took the census of 1900, we found 4,400,000 spinning spindles in the cotton belt, out of nearly 19,500,000 in the country, an increase of sixfold in 20 years. Today we know of the existence in this territory practically of 10,000,000 spindles designed for spinning cotton only, and the number is constantly increasing. The spinning capacity of the South has increased about 130 per cent. in seven years. Neither Lancashire in England, nor Fall River nor New Bedford in the United States ever multiplied cotton spindles so rapidly as the South is now doing.

South Carolina now has two and one-half times as many spindles as in 1900, and holds second rank in number of cotton spindles, having displaced Rhode Island, which until very recently held that rank since the time when Samuel Slater founded the manufacture of cotton at Pawtucket in 1790.

The growth in North Carolina, Georgia and Alabama was only less notable than that in South Carolina; and these four states, with nearly 8,850,000 spindles, exceed the entire spindle capacity of the New England States, outside of Massachusetts, by about 3,000,000.

Nevertheless New England has a long lead over the South, and the spindle capacity of Massachusetts alone is nearly equal to that of all the Southern States combined. In 1870 the six New England states had 77 per cent. of all the spindles in the country. In 1880 this proportion had increased to 81 per cent.; but it declined again to 76.4 per cent. in 1890, and 67.7 per cent. in 1900. At present the proportion is about 56 per cent.

Moreover, the specialization of the industry is becoming characteristic. The building of the necessary machinery for bleaching and finishing her own goods is another distinct development. There exists no economic reason why the South should continue to send her own goods to the Northern mills to be finished.

It is interesting to know that 12 per cent. of the power employed in driving cotton machinery in the South is electrical, as against 6 per cent. in the United States and 4.3 per cent. in New England. Nineteen per cent. of South Carolina's cotton mill power is electrical. It seems to me prob-

able that there is more electrical power employed in the South than in the cotton manufacture of the rest of the world.

At the next census, if growth continues at the present rate, a majority of the American spindles will be south of the Mason and Dixon line. That the future situs of the cotton manufacture of the world is to be in our Southern States, I have no doubt. But that is a long look ahead.

Let me allude to one other characteristic of the development of the southern cotton manufacture. It shows a strong tendency to scatter, throughout the belt, to extend into the smaller cities and towns, instead of concentrating in single cities, as at Manchester and Oldham, and at Fall River, New Bedford and Lowell. This is a distinctly healthy tendency. It reduces the danger of frequent labor troubles, and it certainly tends to mitigate the difficulty of scarcity of help.

This suggests the labor question: the one question which makes trouble, both in production and manufacture. It is not merely an excessive wage rate; it is the absence of the necessary labor at any rate. So acute has the matter become that the harvesting of the cotton crop is imperiled, and the invention of a practical mechanical cotton picker is today the most pressing opportunity for the inventor. As for the mills, the event of the past year has been the organized movement of the southern manufacturers to divert the stream of immigration to the South.

The wonder is that the South should have permitted itself to prematurely reach the conclusion that its great army of black labor cannot be utilized in its cotton mills. Such slight experiment as has thus far been made may have justified this conclusion. The blacks, it is said, cannot be depended upon to return each day to the loom or spinning frame when a fortnight's wages have accumulated and tempt to their expenditure.

If the white man's experience justifies this conclusion, it is the black man's duty to demonstrate that it is based upon too limited a test. The negro is now in a position to prove that it involves a libel upon a large part at least of the southern negroes. The slight tests of the past are not conclusive, and I fully believe that no more valuable experiment could be made just now than the construction of a modern cotton mill in the cotton belt, with white capital, and officered and financed by white men if you choose, but otherwise equipped throughout with selected black help. I believe such an experiment, if wisely conducted for a sufficient length of time, would demonstrate that the negro operative can be relied upon just as fully as the native in the mills of India, and it would settle the labor question so far as the South is concerned. It cannot be settled by the diversion of foreign immigration from northern to southern mills, so long as the present discrepancy continues in the wages of the two sections.

I submit from the census reports, not yet published, a table which shows the average weekly earnings of wage earners in 525 representative mills (49 per cent. of the whole number) in certain New England and Southern states during that week of the year 1904 in which the greatest numbers were employed:

	Total	Men	Women	Children
	$6.47	$7.71	$6.03	$3.21
Four New England States:				
New Hampshire	7.37	8.67	7.05	4.18
Massachusetts	7.47	8.53	6.79	4.42
Rhode Island	7.19	8.42	6.44	3.61
Connecticut	7.36	8.26	6.71	4.02
Three Southern States:				
Georgia	4.56	5.83	4.17	2.62
North Carolina	4.19	5.33	3.82	2.64
South Carolina	4.21	5.15	3.83	2.80

These figures show that the average earnings in the southern mills were 41 per cent. less than in the northern. The labor cost per spindle in 1904 was $4.06 in New England and $3.42 in the South.

It is an interesting fact in this connection that the wages paid vary as widely between different sections of the United States as they do between the United States and the countries of Europe. The wages in the Pacific and far Western states are as much higher than New England wages as New England wages are higher than southern wages.

The figures of the census relating to the labor cost per spindle lead to the conclusion that while cotton mills wages in the North were never so high as at present, the labor cost of manufacture was never so low.

In 1890 the labor cost per spindle in the United States was $4.65; in 1900 it had fallen to $4.48; and in 1905 to $4.08. If we could find the corresponding figures for competing countries I doubt if they would be materially lower. It does not indicate the increasing efficiency of the labor, which we know has not occurred. It signifies the greater efficiency of the machines and the organization.

The study of census returns has led me to the belief that, in most industries, including the cotton manufacture, the labor cost per unit of production is as small here as in any competing country. If this is not true of the cotton manufacture, how is it possible to send $32,000,000 worth of cotton goods to China and elsewhere, in competition with the products of English and German looms? If it is not true, why are such strenuous efforts made to enlarge the avenues for the sale of our cotton abroad? If it is not true, every effort of great organizations, and of the government, to extend this trade, is wasted energy and squandered money.

Because I believe it to be true, I look forward with confidence to the time when the United States, instead of exporting practically two-thirds of its cotton crop, will manufacture by far the greater part of it at home, and will secure for her own people the enormous profits which lie in manufacturing this staple.

The Evolution of the Lug Strap.

BY W. IRVING BULLARD, Danielson, Conn.

In excess of 450,000 yards of cotton duck and ticking, averaging 8 ounces in weight, were used for the manufacture of cloth lug straps during the twelve months ending September 15th, 1907. During this period 900,000 canvas and ticking lug straps were made and consumed, as compared

with a production of not over 20,000, fifteen years ago, while thirty years ago the cloth lug strap was but an idea. I do not believe there is another business allied to the cotton industry that can show such a wonderful growth during the same period.

A modern duck loom on 8 ounce duck, 32 picks per inch, speed 160 picks per minute, would give a possible product of 25,000 yards for 300 days, or one working year, but the real product would probably be about 70 per cent. of this, or 17,500 yards. Considering the production of ticking per loom year, the same as duck, it is apparent that the cloth required for a year's production of lug straps, represents the output of a 30 loom mill, with modern equipment.

The lug strap primeval was made of a single thickness of poor quality or second hand leather with slots sufficiently wide for the bolt and long enough for a great amount of "taking up." Because of the elasticity of the single ply leather strap, adjustment became chronic. For fifty years or more there was no change in the lug strap.

A thoughtful loom fixer tried hoop and band iron strips bent to conform to the requirements of a lug strap. The iron strap proved too rigid and was an expensive experiment. Picker sticks were snapped in twain and castings were broken time and time again before it was discovered that a proper amount of elasticity was a vital quality in a lug strap.

Then a genius discovered how to whittle a piece of soft wood into the form of a lug strap. This soon became a popular amusement in the supply room and loom fixers resting grounds. But, alas! the vibration and speed of the picker stick soon became too formidable a competitor for the wooden lug strap as whittled in the "Arts and Crafts" style. Even the formed and bent wooden lug straps, made from hickory, were found valueless on account of the noise and lack of tensile strength.

Fiber was tried but the same difficulties arose as with metal and wood; the material was too brittle and could not withstand the vibration of the picking stick.

In the meantime leather lug strap and belt makers were advised of the necessity for an improvement in lug straps. The two and three ply formed leather lug strap resulted. This was a marked improvement over the single ply leather strap and a broad market was soon created. These two and three ply leather lug straps were sold for from 25 to 35 cents per pound or about one-half of the present selling prices.

The lack of uniformity of the quality of leather used has always been the greatest handicap of the leather strap. The material that goes into the plain leather lug in usually the by-product of the belt and naturally of an inferior quality and not capable of giving a maximum of efficiency.

Another disadvantage the leather lug has is the tendency to "dry rot" on account of the hot, dry air in the weave room. Humidifiers have done much to overcome this difficulty but the cause of leather "dry rot" in the weave room has not been removed by any means.

In the year 1876, a loom fixer for one of the

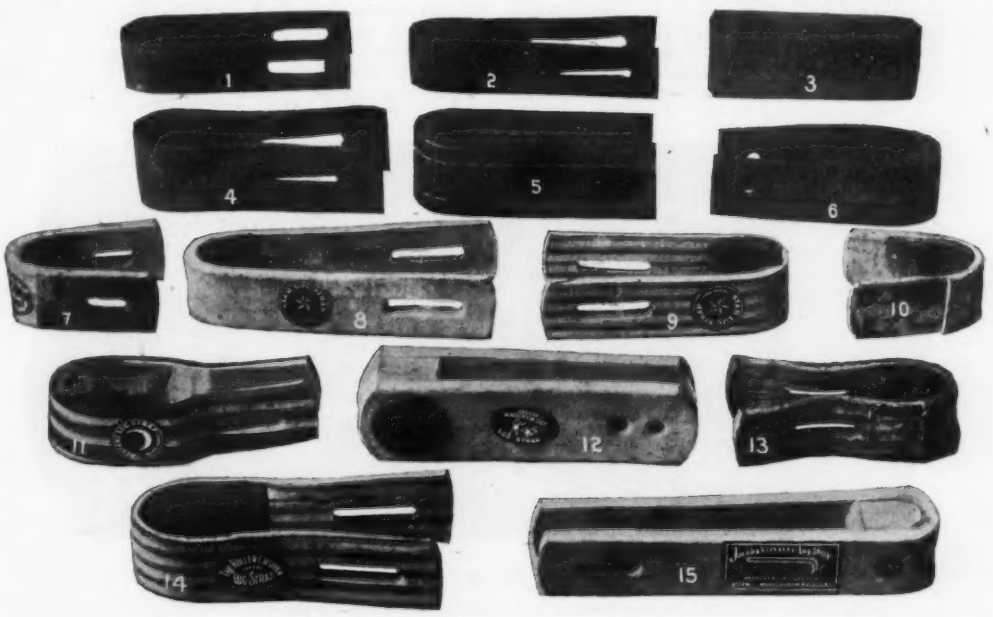


FIG. 1. THE EVOLUTION OF THE LUG STRAP.

1. Single Ply Leather Lug Strap. 2. Hoop Iron Strap. 3. Wooden Strap. 4. Improved Wooden Strap. 5. Folded and Stitched Leather Strap. 6. Plain Fibre Strap. 7. Leather Covered with Canvas. 8. Plain Duck Strap. 9. Plain Ticking Strap. 10. Fibre Covered with Canvas. 11. Formed Ticking Strap. 12. Reinforced Canvas Strap. 13. Iron Rods Covered with Ticking. 14. Moulded and Formed Ticking Strap. 15. Improved Reinforced Canvas Lug Strap.

older cotton mills in Rhode Island, rolled squares of awning remnants and bed ticking into the shape of a single ply leather lug strap, such as was in universal use at that period, without cementing or using any adhesive properties. This rolled fabric was substituted for the leather lug strap on the picker stick end; but its life was very short. As soon as the cloth started to tear, the strap was useless. Yet this was the conception of the cloth lug strap.

The next development was the cementing of pieces of canvas one yard square to a thickness slightly in excess of a single ply leather lug strap, this forming a block of canvas in cemented layers. The block was allowed to dry several days and then divided, by sawing, into lengths and widths of a lug strap. This strap was a vast improvement over leather, and further effort carried the canvas lug strap to a condition of manufacture that gave a possible production of 60 per day per man. Today, the same canvas lug strap can be manufactured at the rate of 60 per hour per man.

The plain canvas and ticking lug straps were popular and were generally used up to within ten years. In the natural course of events there had to be evolution in the cloth lug strap and so the leather covered with 8 or 10 ounce duck or ticking was projected, manufactured and became an article of commerce. It had the elasticity of the leather lug that gave an easy pick and the tensile strength of canvas. The combination was superb.

The Crescent lug strap was the next improvement. This strap is so moulded and formed as to receive the impact of the picker stick on the entire surface of the bow of the strap instead of the edges as with a plain lug strap. It is used extensively in the mills at Fall River and New Bedford because it is inexpensive and gives greater service than the plain duck or ticking strap.

The Knock-Em-Out lug strap was manufactured successfully for several years. This strap was made with two parallel sides bolted through two bunters at the heel forming the bow, and required considerably more power than a plain strap; consequently was condemned on account of its weight. The advantage was that the bunters, where the wear comes, could be renewed easily and at a very small cost.

The Eclipse and the Eclipse Junior lug strap have had a successful run. The original Eclipse is made with Norway iron rods so formed and covered with ticking that it gives an easy pick considering its durability. It is particularly adapted for heavy work. The Eclipse Junior is made from fiber covered with duck and appears to meet the requirements of certain mills very successfully.

Ten years ago the Roller Cushion lug strap was invented and patented. It is made of ticking compressed and bent to present a bow end reduced in width and increased in thickness, and plano-convex in cross sections, to thereby form an integral, interiorly, convex impact surface. The advantage of this strap over the plain duck strap is that at the points of contact with the picker stick, both in the bow of the strap and at its sides, the rocking movement of the picker stick serves to pound and mutilate the upper and lower edges of the plain duck strap while in the Roller Cushion there is provided the desired curved form at the bow end so that a roller motion is created thus distributing the strain.

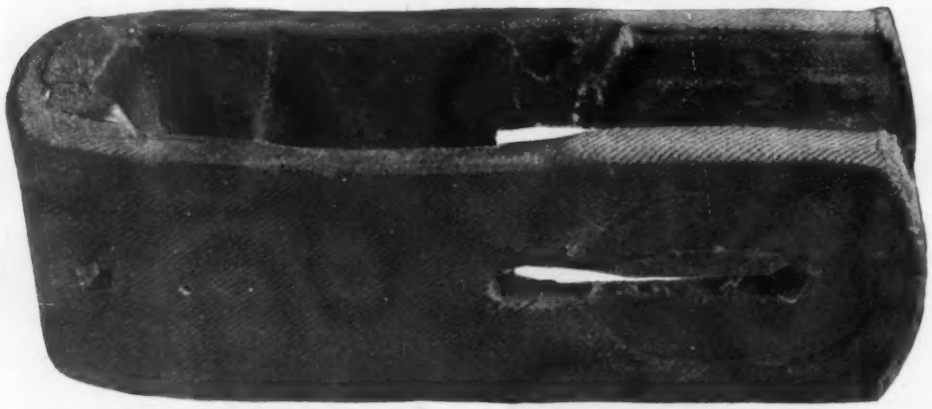


FIG. 2.

A Jacobs "Verybest" Lug Strap, after fourteen years of continuous service on a 40" Colvin loom, running 152 picks per minute.

After competitive tests in the experimental department of Draper Company, Hopedale, Mass., two years ago, this strap was proven of greater service to the Northrop loom than the plain duck or ticking strap. It gave longer service, an easier pick and consequently greater production of cloth.

August 3rd, 1900, the Berkshire Cotton Manufacturing Company, Adams, Mass., wrote that a Roller Cushion lug strap put on one of their looms in Mill No. 2, wore four years and ten months. In 1897, one of the mills of this company, containing 2240 looms, was equipped throughout with the Roller Cushion lug strap. I am indebted to Mr. C. T. Plunkett, secretary of the Berkshire Cotton Manufacturing Company, for the information that

very few straps were replaced for five years after the looms were started, and August 14th, this year, there were a good number of the original Roller Cushion straps still on the looms. If these straps averaged to wear five years the cost per loom-year for the long Roller Cushion lug strap was 4 cents.

Statistics that I have secured from a score of cotton mills show that the average life time of the plain lug strap, used on the picker stick end, is thirty-two weeks and eighteen weeks for the short or shackle strap. This represents a cost per loom-year for plain lug straps of about 46 cents, allowing 20 cents for the long lugs and 26 cents for the shackle straps.

The last evolutionary step in the canvas lug strap was taken in February, 1892, when two extra heavy canvas straps were made and a convex surfaced plug of canvas was bolted through the heel of these straps so that the bow was reinforced. On the 27th of that month these two straps were attached to looms 49 and 178,40 inch Colvin looms running 152 picks per minute, at the Quinebaug Mill, Danielson, Conn In a few years these straps were forgotten, loom fixers were changed and the straps received no special attention.

In 1901, one of the straps was taken off in perfect condition, the plug only showing wear, and February 27th, 1906, the second strap was taken off ofter completing a continuous service of fourteen years.

As it takes from 10 minutes to an hour to replace a lug strap or repair the damage caused by a broken one there must have been hours and hours of lost time saved by the use of such a strap, at a cost of 3 cents per loom-year for the long lug straps.

Just consider, if you please, the additional production secured from these looms that ran continuously for fourteen years without changing lug straps.

The claims as given in the patent papers for this lug strap which is commercially called the "Verybest," read as follows:

"1. A plug for the lug strap of a loom formed of compressed woven fabric in layers, and having an operating-surface formed by the edges of the fabric.

"2. A lug strap for picker sticks comprising a loop, and a plug fitted therein, said plug having a convex face for engagement with the picker stick, and being made of compressed fabric in layers, and presenting the edges or warp of the fabric to the picker stick, said edges lying on convex face."

A practical definition of this is that the convex faced block gives a roller motion to the strap and picker stick when in contact, similar to the Roller Cushion, and as the stronger part of the fabric—the warp—is presented to the wearing surface, the result is that the worn fabric matts down and forms a cushion thus giving an easy pick. The strap is made extra heavy and out of the best of double thread warp and filling, northern 10 ounce duck, so that the life time of the strap is determined by the actual wearing away or elimination of the plug. As soon as the plug is worn down to the heel of the lug strap proper it can be replaced at a small cost.

The Lancaster Mills at Clinton, Mass., experimented with this lug strap and are equipping all of their looms with it. For years this mill has used heavy leather lug straps. I might name scores and scores of other prominent cotton mills that have adopted this strap after competitive tests.

In this connection it is interesting to note the tensile-strength tests of numerous lug straps that I had made not long ago at Brown University, Providence, R. I. The table follows:

Plain Canvas	1,800 lbs.
Roller Cushion	3,500 lbs.
Verybest	4,870 lbs.
Leather from 1,200 to	2,200 lbs.

In closing allow me to state that it is my honest opinion that the plain canvas, ticking and leather lug straps are far more expensive to the cotton manufacturer than the straps showing a greater tensile strength, and evolved from the plain strap. In these days of stiff competition you must have production, and at a minimum of cost. You can secure this only when in your loom supplies you have 100 per cent. efficiency.

An Analysis of Usage.

BY GEORGE OTIS DRAPER, Hopedale, Mass.

Those connected with a great industry like that on which our organization is founded should find interest, and even profit, in analyzing the fundamental human impulses which stimulate the desires that make our products salable. Cotton manufactures represent a division of textiles, and they, as a class, have evoluted from the early use of coverings originally intended to protect the human body from certain uncomfortable temperatures or certain unpleasing contacts. The first definite effort toward supplementing the work of nature was made by use of the skin of a slain beast as a coverlet unless bundles of leaves or grass may have anticipated this application; but the use of skins certainly anticipated plaiting, or weaving, of leaves or grass into any definite structure. The real beginning of the textile industry started in the twisting together of short fibres to make a thread; and whether this first thread were made from goat hair, sheep wool, cotton, linen, or other fiber is not material to the present discussion. It is probable that the earlier threads were used in sewing skins together or in making fish-lines, nets or snares. The first closely woven cloth was probably intended to give warmth to the owner.

The habit of covering the body in cold climates, or during cold seasons, was soon found to afford certain ungainly or ill-formed citizens a means of concealing their physical defects. As the majority are always inferior in any line to a carefully chosen minority, it is easy to conceive of how the habit of covering, and thus hiding the human form, continued, spreading its use over seasons and over lands where clothing was not necessary, in fact, primarily inadvisable. The precedent established with the approval of majorities incites imitation, since the average human being dislikes the uncomfortable notoriety always attending those who assume to be different from their neighbors. The tendency toward imitation is probably stronger than any impulse originating

through calculation, especially when not catering to a fundamental necessity. There is no doubt but that the present accepted styles in clothing enforce the consumption of a high per cent. of product for purposes of concealment alone, the skirts worn by the feminine half of the population being particularly prominent in the inventory. The element of mystery associated with such concealment has undoubtedly had considerable effect in the continuation of the nature of apparel chosen, the desire to arouse the interest of the other sex readily availing itself of any such effective expedient. Continued custom so strengthens itself with tradition and association that it is not surprising to note that our law itself insists on our wearing clothes whether we will or not. Judges have fined men for contempt who appeared in court without the particular form of covering known as a coat, and hotels and restaurants have refused admission to men wearing shirtwaists, although the common male contour is hardly so beautiful as to be dangerous in its fascination.

Another important motive, of early birth, was the very natural desire to attract interest or possibly arouse admiration through the use of such material or such design as could increase the effectiveness of a garment in its capacity to allure observation. It is probable that the use of bright coloring first exemplified this method, since Nature herself employs the use of color in determining what species of plants and animals shall survive. The use of clothing for decorative purposes again allowed those normally unattractive to augment their lack of charm by these artificial embellishments. The naturally favored also embraced the opportunity to enhance their attractions, and thus preserve their comparative position in the scale of prominence.

When certain citizens began to amass property, or obtain any marked ascendency over their fellow-beings, primitive vanity asserted itself in suggesting the desirability of advertising superiority through display. It then became essential for clothing to be not only warm and attractive, but also to embody different degrees of richness in the material or in the evident labor of its manufacture. This in turn suggested the creating of substitutes in material or workmanship of cheaper nature designed to imitate the effect produced by truer qualities. In the general result it often hap-

COTTON PRODUCTS PRODUCED DURING 1904.

	Square yds.	Value	Value per yard.
Plain cloths for printing or converting	1,818,216,172	$80,311,612	.043+
Brown or bleached sheetings and shirtings	1,172,309,182	61,253,376	.052+
Ginghams	302,316,132	22,471,867	.074+
Ticks, denims and stripes,	256,375,486	23,797,578	.092+
Drills	194,735,303	12,596,063	.064+
Twills and sateens	366,142,513	23,701,305	.064+
Cottonades	25,362,346	2,998,971	.118+
Napped fabrics	330,808,140	26,108,315	.078+
Fancy woven fabrics	306,254,685	28,486,342	.093+
Corduroy, cotton velvet and plush	16,014,556	4,790,573	.299+
Duck	122,601,212	17,005,982	.138+
Bags and bagging	57,067,663	3,953,732	.069+
Mosquito and other netting	36,232,918	994,953	.021+
Upholstery goods, including lace and lace curtains	65,592,212	12,111,698	.184+
	5,070,028,520	320,382,367	.063+
Yarns for sale		79,885,387	
Sewing cotton		15,043,043	
Twine		1,282,947	
Tape and webbing		49,546	
Batting and wadding		1,173,343	
Waste for sale		10,049,037	
Other products of cotton		2,605,801	
All other products		11,979,747	
Total		$442,451,218	
Cotton small wares—lacings, wicks, tapes, edging, etc.		8,016,486	
Total, including small wares		$450,467,704	
Cost of materials		286,255,303	
Value added by manufacture		$164,212,401	
Wages paid	$96,205,796		
Miscellaneous expenses	30,487,378	126,693,174	
Profit, depreciation, selling expense, etc.		$37,519,227	
Per cent. on product value		8.32 per cent.	
Per cent. on value added by manufacture		22.84 per cent.	
Per cent. on capital ($613,110,655)		6.01 per cent.	

pens that the natural purposes of warmth and attractiveness are sacrificed to the desire for display. Rich stuffs are thus often used in too great profusion, intricate patterns or designs employed where plainness would be better effective, and certain fabrics, naturally fitted for particular purposes, condemned simply because of their evident cheapness.

Cotton manufacturers, however, represent a high percentage of utility since the cheapness of the raw material makes them particularly desirable for use by those who must economize and who naturally pay little for superfluities. Bulletin No. 74, issued by the Department of Commerce and Labor during 1907, gives detailed statistics by which the products for a year as recent as 1904 are analyzed. Care must always be taken in quoting from census manuscripts to note that the actual year is not the year quoted; for instance, the census statistics give certain data as of the year 1905 when they mean the year ending with the beginning of 1905, or, as we should know it, the year 1904. From certain of these statistics, as now tabled, we gather that the profits of the industry for that year were certainly not sufficient to incite any unfavorable comment, but such deductions are

IMPORTS OF COTTON MANUFACTURES, 1904.

	Square yds.	Value.	Value per yard.
Bleached and unbleached	1,309,358	$ 155,695	.118+
Printed, painted and colored	46,210,012	7,794,179	.170+
	47,519,370	7,949,874	.168+
Cotton clothing, not including knit goods		2,380,658	
Embroideries, laces. lace curtains, insertions, trimmings, cords and gimps		25,911,684	
Knit goods		6,150,484	
Thread (not on spools) yarns, warps or warp yarns		2,204,154	
All other manufactures		4,323,082	
		48,919,636	
Re-exports of similar goods		332,917	
Net imports		$48,587,019	

EXPORTS OF COTTON MANUFACTURERS, 1904.

Bleached and unbleached	566,584,218	$33,995,134	.160+
Printed, painted and colored	127,916,497	7,325,400	.057+
	694,500,715	41,320,542	.059+
Wearing apparel		3,477,652	
All other manufactures		4,867,886	
		$49,666,080	
Of the cloth above exported, the Chinese Empire took a total of		$27,761,095	

STATISTICS OF MANUFACTURES IN WHICH COTTON YARNS WERE USED IN PART IN 1904.

	Value of Products.
Hosiery and knit goods	$136,558,139
Wool Manufactures	380,934,003
Silk and silk goods	133,288,072
Dyeing and finishing of textiles	50,849,545

OTHER TEXTILES.

		Value of Products.
Flax, hemp and jute products		$62,939,329
Cotton manufactures		450,467,704
Total for all textiles		$1.215,036,792
Cost or materials		745,783,168
Value added in manufacture		469,253,624
Wages paid	$249,357,277	
Miscellaneous expenses	86,110,180	335,467,457
Profits depreciation, selling expenses, etc.		$133,786,167
Per cent. on product value		11.01 per cent.
Per cent. on value added by manufacture		28.51 per cent.
Per cent. on capital ($1,343.324,605)		9.95 per cent.

foreign to the purpose of the present investigation. They do show that a considerable expense is added in the weaving of patterns in ginghams and other fancy woven fabrics; that a considerable expense is added by dyeing and finishing, and for upholstery goods, including a large element of importations. There is hardly any use of upholstery which can be considered as fundamentally necessary, since people have lived through ages of civilization without textile coverings for floor, window or furniture.

The average depreciation and selling expense would practically eliminate this apparent profit entirely. The figures given do not admit of proper dissection of this total.

Of the value of product added in the dyeing and finishing of textiles, there is some $38,187,700 pertaining to cotton goods alone. Adding this to cotton manufactures increases the total to $488,-655,404.

Of the value added to cotton yarn when manufactured into hosiery or knit goods there are no determining statistics, but if we assume the cotton yarn used as two-thirds of the raw product in bulk, we would have some $40,000,000 as the proportion of value added in the manufacture, again increasing our total of cotton manufactures to $528,-655,404.

The woolen and worsted manufactures used in 1904, $12,896,381 worth of cotton yarn, and $4,541,-219 worth of raw cotton. The final product is a mixture in which it is difficult to apportion the value that should be confined to cotton as a manufacture. It is perhaps best for statistical purposes to consider all such product as a part of woolen manufactures.

The statistics as shown are somewhat differently arranged than in the government bulletin and supplemented by deductive figuring. They may prove of interest for other purposes than those now considered.

If we assume the extra cost of ginghams, fancy weaves, etc., as due mainly to the extra cost of weaving their intricate patterns, we could set off about $25,000,000 as unnecessary from the standpoint of strict utility. Add to this the cost of upholstery made and imported, together with a fair allowance for the extra expense in other imported fabrics, and we might set off $45,000,000 more. To this add the extra cost of dyeing, printing and finishing, some $38,000,000, and we have a total of $108,000,000 not representing strict utility unless it be assumed that color renders service by hiding signs of wear or stain that might otherwise tend to shorten the use of the material. Quite recently another use for color has been suggested, since the experience at Panama has seemed to show us that white races are adversely affected by the strong rays of the sun, the native races being protected by the dark pigment in their skin. The use of colored cloths in this climate allows the absorption of the dangerous rays before reaching the skin. Even if some coloring is necessary for various purposes its cost would be more than offset by the added unnecessary expense in weaving many other fabrics not contained in this division. From the total of $528,655,404, there is at least 20 per cent. due to color, finish and pattern, if we consider the imports and offset the exports. This per cent. would show larger relatively to the cost of manufacture in the other textile lines. If we attempt to divide textile products of cotton substances into uses representing necessity, utility and vanity, we have no detailed statistics from which to estimate, and no known partition between conflicting human motives. Some might urge that no actual necessity is present in use of hosiery, underwear, sheets, skirts, table-cloths, or towels. There would be little question regarding the common uses of duck, denims, tickings, drills, bags, sewing cotton and twine. Cotton cloths are used in many material applications other than personal usage, such as pneumatic tires, pads for horse collars, linings for buggy tops, shelter for tobacco plants and fruit trees, etc. There might be some discussion over the common uses of plushes, velvets, laces and other fancy weaves.

Civilization has some evoluted rights, however, and it is consistent to admit of the necessity in self-respecting individuals for skin coverings that admit of frequent change for washing. As cotton manufacturers we are highly interested in spreading the standards of civilization and educating the majority to a higher regard for personal cleanliness because of the greater production of goods necessary to replace those worn out at the washboard. The mere purchase of more cloth per individual would only give a temporary gain, since it would not increase the amount of cloth worn out by an individual. Change of styles affects considerable additional purchase since cloths are discarded, before being entirely worn out, in the adoption of the newer styles.

Increased demand for cotton fabrics naturally tends to increase the prices that can be charged by the manufacturers. The great majority of cotton fabrics are destined for practical utility rather than display. We should, therefore, profit by any change of attitude that lessens desire for display if at the same time recognizing the advantages in a more liberal supply of the utility cloths. We should also profit by any change of habit that would substitute cotton fabrics for those of any other substance. There can be but little gain in this line, since use of cotton is already so universal, but there are possible increases in use in a change of habit by which large numbers of our citizens might recognize advantage in use of underwear.

In this particular field there is open chance for an interesting conflict between members of our own organization since there is a definite trend toward use of woven fabric for light underwear in place of knitted garments. Loosely fitting woven goods are thought more comfortable by many than close-fitting knitted garments for summer wear. It is becoming more and more common for light-weight underwear to be worn throughout the year, since so large an element of our population spend the greater part of their time in home, factory, or office, where the temperature is artificially regulated and usually kept too high if winter-weight clothing is worn. Mills who weave woolen and worsted goods for outer clothing inform me that there is a definite trend toward lighter weight fabrics, and a scientific dissection of requirements would certainly advise a recognition of the normal temperature in which the individual is placed.

When we consider goods made with elaborate

weaves, or printed with fancy colors, we enter a curious realm of competition in which the styles are most variable since new patterns are designed each season, involving important expense in paying the designers, changing machinery, advertising the novelties, etc. The mere samples made up into books for use by jobbers represent 2 per cent. of the total product of certain mills. The author was once financially interested in an elastic fabric concern, supplying goods for the garter trade, in which so many new patterns were required each season that it was estimated that from American concerns alone there were hundreds of new designs each year to meet a demand for a product supposedly hidden from view in use. It might be easily figured that with the textile industry concentrated into vast organizations, eliminating competition, the multiplicity of patterns could be greatly reduced and large economy effected. It must be remembered, however, that the very competition between the large field of producers stimulates activity in purchase, materially increasing the desires of the consumers. This was well illustrated back in the palmy days of the bicycle when many shops gained high trade activity through competitive advertising and salesmanship. When the leading concerns went into a combination which decided to reduce the styles of the machine and cut down the advertising the demand suddenly dropped off enough to practically ruin the industry.

There has been an unwarranted and even silly prejudice against the use of cotton merely because of its cheapness, it being illogically assumed that a substitution which results in economy must necessarily produce inferior results. The old forces of custom and tradition continue their suspicion of novelty, since woolen cloths were used for ages by our Anglo-Saxon ancestry before cotton became known to Europeans. On May 14, 1645, the General Court of Massachusetts passed an order in which it referred to poor people being obliged to clothe their children with cotton cloth, "not being able to get other," whereby some of them were "much scorched with fire, yea, divers burnt to death." It is certainly sad to think of people made so chilly by wearing cotton that they ventured so near the fire as to be roasted, but we seem to have somehow avoided such dangers through the evolution of necessary caution.

The habit of using cotton warps with woolen and worsted filling is also subject to comment, although goods so made may be much better for use than goods, equally cheap, in which low grade woolens are used. The fact that mercerized cotton seems to imitate silk by no means proves it inferior for many purposes. It has a legitimate field of its own, and the fact that a chemical process produces a favorable change should not discredit it because other materials are favored by natural processes. It certainly is inadvisable to encourage fraud by representing any product to be other than it is, but it is also indefensible on the part of the consumer to be so ignorant, so prejudiced, or so bigoted that true value may not be appreciated. We have a healthy contempt for shams, well illustrated by the fact that we have no branch of industry to compare with the manufacture of heavily sized or clay-weighted goods for personal wear made on so large a scale in England for export; yet if there are purchasers who knowingly want that class of goods for their peculiar purposes there is no legitimate reason against our supplying their demand. Many cotton fabrics are sold in Eastern countries for uses in which cheapness is a forced necessity. The buyers prefer a fabric so cheap that it can be thrown away after a short period of use to a good fabric which would require repeated washings to extend its period of service sufficiently to authorize its added cost. It is not our business to dictate to others what their habits shall be in countries beyond our jurisdiction, especially to people of different race, living in different lands under different climatic conditions. It is commonly known that we cut ourselves off from many possibilities for foreign trade because we will not note the peculiar requirements of possible purchasers who will not flatter our conceit by admitting that we, alone, know proper methods.

The whole useless expense of unnecessary patterns, unsuitable structures, catering to mere habit and slavish following of new styles, would make a distinctly impressive total. But since these possible errors of human application all seem to increase the consumption of our products, we may view them philosophically. We may too readily assume that cotton products have become firmly established, but the possible shrinkage in use through necessity was well illustrated through the civil war, when the production of cotton fell from a crop of some 4,700,000 bales in the season of '61-'62, to a crop of about 300,000 bales in '64-65. For seven seasons the crop was under 2,500,000 bales, though it had been much higher than that for each of the previous eleven seasons. It is evident that the world had to get along for this time without its usual proportion of cotton fabrics and did get along although its population was yearly increasing; but it is not on record that any larger per cent. went naked. They simply used less cotton clothing, getting more wear out of that which was in use. A return to like economy would ruin us.

I think our organization as a whole has shown greater interest in economizing the production of cotton fabrics than in extending their use. I see no reason why it is not both legitimate and advisable for us individually, and as a body, to stimulate the further use of cotton fabrics. Since our labor cost is relatively high, and our tariff by no means impregnable, the majority of us are interested in spreading the use of the cheaper fabrics, increasing consumption by the common people. Such increase will assume even more importance if the tariff be reduced to interfere with our present prosperous production of fine cotton goods, thereby forcing fine mills on to cheaper fabrics, and increasing the competition of our present mills on medium grades. It is by no means impossible that a concerted, definite, studied, vigorous, education campaign might not accomplish important results in such an open field.

The Cotton Manufacturer and the Fire Waste.

BY H. L. PHILLIPS, Hartford, Conn.

This is a broad subject and an effort will be made to treat it not only specifically but also in a

general way as a certain relationship does exist between the cotton manufacturer and the fire waste of the country at large.

The wonderful success of your efforts in improving the cotton mill from a fire standpoint also causes me to feel justified in taking a topic which is so broad in its application, believing as I do that you can, by a concerted effort, accomplish much towards improving conditions generally.

In these days when engineering plays such an important part in practically every problem which confronts us, there is perhaps a nervous and even almost an insane effort to accomplish and surpass, and a tendency to search for the hidden and occult with the result that many of the simple yet equally important truths are in danger of being overlooked. Therefore we shall not attempt anything new but rather endeavor to present old ideas in a new form.

For me to point out to you gentlemen how to equip and protect your cotton mills against fire would be presumptuous on my part and would be like "carrying coal to Newcastle" because you manufacturers had the honor to start the reform which resulted in the present conditions whereby the cotton mill even with its highly inflammable stock is considered almost as desirable a risk from a fire standpoint as any other manufacturing property.

Following your lead other manufacturers took up the good work, with the result that the seeds which you sowed fifty or more years ago have brought forth an abundant return.

You all know about the advantage of mill construction, the need of safely separating the hazardous processes, the importance of sprinkler protection and other fire fighting devices, and the absolute necessity of having a water supply for fire purposes, practically inexhaustible and of heavy pressure. You know about this and the engineers whom you employ to build your properties are likewise familiar with the requirements.

But after the construction is completed and you begin to operate there is quite naturally a tendency for you to think first and foremost of production and leave the fire hazard to be brought to your notice by the insurance authorities, which is but the natural outgrowth of the system which is now almost universally established of frequent regular inspections by parties experienced and competent to pass upon the conditions as they may be found and qualified too, to suggest ways for improving the situation.

THE INSPECTOR.

This feature enters directly into this subject. The insurance inspector is the man who stands between the parties directly interested and whose duty it is to place before the assured the experience which the insurance authorities have acquired in the care of thousands of risks, and also to carry to his own people ideas about fire prevention from individual risks which may in turn be imparted to all for the good of the cause.

If I may be permitted to speak plainly I fear that there is perhaps a prejudice towards this individual which results in antagonism, which is profitable to none. I don't claim the inspectors are infallible but I do know that they are almost without exception earnest and zealous workers and that it is a relief to their mind to find a mill in perfect condition rather than to be in a position of feeling necessary to offer suggestions for improvement, which we hear many times they are expected to do if they wish to keep their position.

I make a plea for more consideration for the inspector and I can add that fires have occurred and losses have been increased due solely to a failure on the part of the assured to adopt suggestions for improvement that have been offered but where the insurance authorities have deferred to the judgment of the owners of the property in these particulars.

To be sure the personal equation enters into this feature very prominently but I know that the insurance people make an effort to send out only such men to represent them as they feel will be entirely satisfactory.

THE ORDINARY FIRE.

From the experience thus acquired and from the record of fires, it is my purpose to point out a few special features which add materially to the fire loss. It is a fact, strange as it may seem, that a large percentage of fires in factory risks of all classes is caused by ordinary hazards and not altogether by special hazards peculiar to the particular business. In cotton mills, of course, with the great frequency of picker fires, the proportion of fires from ordinary causes is smaller than in other risks, yet cannot the picker fire ordinarily be charged to some outside agent rather than to the cotton? The cotton itself does not start the fire but rather it is there to burn when ignited by some other source. The serious cotton mill fires seldom originate in the picker room. The size of picker fires is not troublesome though their frequency is annoying and disturbing.

What causes the picker fire? Occasionally a hot bearing, an ordinary hazard, many times a metal substance passing through the machine, while in a majority of cases it is the simple and common and apparently insignificant friction or snap match which is responsible.

The matter of a heated bearing is one of administration, the feature of the buckle or the nail or bit of iron is an argument in favor of the machine opening and conveying of cotton under safe conditions involving the use of a fan with bronze blades, avoiding passing the cotton through the fan, which can readily be done where the distance is moderate, say 250 feet, but, what is more essential, having the conveyor pipe where the cotton first enters the tube, arranged in an upward vertical position for a distance of at least twelve feet so that heavy foreign substances will fall out by gravity and not be carried along to the picker.

There is only one remedy for the match hazard and that is of course the universal use of the so-called safety match which ignites only when struck on the box in which it is sold. To use safety matches is merely a matter of habit, and it is a favorable sign of the times to see the interest which manufacturers and especially cotton manufacturers are showing and the action which they are taking. Not a few factories furnish these safety matches free of charge to all employes, the expense being justified in the reduction of the picker fires.

In other cases where the mill owns or controls

the commissary, only safety matches are kept for sale, a method of meeting the situation which is perhaps peculiarly suited to the South.

The desired end can only be reached, however, by legislation, and it is hoped that the manufacturers will use their influence in having suitable laws enacted.

THE EXTRAORDINARY FIRE.

Coming to other types of fires, namely, those outside the picker room, we find the list of large fires. What is responsible? Nothing deep or hidden or beyond comprehension, but on the other hand an unsprinkled dye house "the building so wet that it can't possibly burn" or the unequipped boiler or engine room with its "nothing to burn but the roof"—and what is always fatal and could have so easily been avoided, the "closed valve."

The remedy for the first two is simple enough though not always willingly or voluntarily applied, namely, the equipment of every portion of the property, of every nook and corner, with automatic sprinklers.

For the closed valve, however, "eternal vigilance can be the only salvation." The introduction of a self inspection system, by means of which all valves will be examined at least weekly and perhaps even daily will safeguard this feature to a considerable extent, and will of course disclose valves shut criminally by some employe to "get even," or mischievously or inadvertently; but where valves are closed for repairs, alterations or extensions, a responsible man should be left at the valve to open it at a moment's notice. Nor should he be like the mill operative who, while being catechised by his employer in the presence of the insurance inspector, as to what he would do in case of fire, began to tremble and stammered "Be gorra, I'd grab my coat and run like the devil."

As a further safeguard the insurance authorities should always be advised, in advance if possible, when water is to be shut off, so that their representative may be on the ground to offer suggestions to the end that the work will be done with the utmost despatch.

THE COTTON BALE.

One feaure which contributes very largely to the fire waste is the cotton bale, on which subject a very able paper was delivered before your Association. The cotton bale in itself is met with in all stages of transportation from the gin to the factory; the railroad platform where the cotton is subject to the spark hazard, the compress and its platform of enormous area where the same hazard exists as well as the hazard of the compress itself, then the hazard of transportation and finally the warehousing of the cotton.

But little need be said in regard to storage of cotton at the mill. The importance and advantages of one-story warehouses of limited area with cotton stored one bale high standing on end under complete automatic sprinkler protection, are well known, and these features are ordinarily adopted readily and willingly where space permits. In cities where land is not available for this type of storage we find the warehouses a number of stories in height which are now ordinarily equipped with sprinklers and where the cotton should be, of course, one high on end. The method of piling cotton is in our judgment the essential feature in cotton storage. With the bales one high on end the water from the sprinklers can cover all sides, while on the other hand, when the bales are piled on sides two, three or more deep, the water from the sprinklers is not likely to reach all bales owing to the joints being broken and some of the bales probably shedding water, thus permitting a fire to travel perhaps either the length or the breadth of the warehouse without it being stopped by the sprinklers as would be the case with cotton standing on end one bale high only.

Experience has proved conclusively that a fire in a sprinkled cotton warehouse, where the cotton stands one bale high on end is a small affair, whereas on the other hand, the heavy losses come where cotton is piled several bales high on sides.

Not much can be done with the transportation feature in itself. That flat cars should not be used is apparent to all, but further than that there is little to be said.

When it comes to railroad platforms and compresses with their platforms, however, we feel that improvements can be made which will reduce the fire hazard and materially cut down the fire waste. Of course one of the principal factors in causing these fires to spread is the wretched method of baling cotton, and I believe that if your Association can improve the baling of cotton it will materially reduce the fire waste of the cotton platform and compress.

Aside from this particular feature, the platform at the railroad station should not be open but should be covered, and furthermore the compress platform should, in addition to being covered, be divided into sections of limited area so that not over 500 bales would be subject to one fire, added to which there should be a complete equipment of automatic sprinklers throughout.

The National Fire Protection Association, which organization I have the honor to represent as delegate to your convention, has now under advisement by its Executive Committee the question of investigating the method of baling cotton, and our Association shall be glad to do all in its power to co-operate with your organization in obtaining improved conditions.

To take up the subject in a still broader sense, I would state that the average yearly per capita loss in the United States for the five years ending 1905, was $2.47, whereas a similar computation covering six countries in Europe, Austria, Denmark, France, Germany, Italy and Switzerland, shows a loss varying from 12 to 49 cents only, or an average of 33 cents per year for each inhabitant. These figures are astounding and something surely must needs be done to cut down this enormous waste. With San Franisco last year the per capita loss in the United States rose to $3.30. What is the cause of it? Simply improper building laws and lack of proper fire protection.

The insurance companies of this country act as one of the most essential supports of our entire financial system and while they have stood shock after shock and can withstand many more yet no one will deny that it would be better for all could these losses be reduced.

Realizing that there was much opportunity for improving conditions generally, the National Fire

Protection Association was organized ten or twelve years ago and now counts among its members practically all of the Insurance Organizations of this country together with many National Institutes, Associations and Societies where engineering in any way enters into the organization. To be sure the constitution of the N. F. P. A. requires none of its members to be bound to any action but of course the moral effect can be very great. In this way the N. F. P. A. in its study of the prevention of fire has promulgated rules and standards which are almost universally adopted at the present time. Some of the topics taken up for consideration and upon which printed rules have been issued are as follows:

Fire Doors and Shutters.
National Electrical Code.
Uniform Requirements, (Mill Construction).
Wired Glass Windows.
Skylights.
Protection Against Lightning.
Automatic Sprinkler Equipment.
Fire Pumps (Steam, Rotary and Electric).
Fire Hose.
Hose Houses.
Hydrants and Valves.
National Standard for Hose Couplings.
Chemical Fire Extinguishers.
Rules for Gas and Gasoline Engines.
Gasoline and Acetylene Lighting Machines.
Coal Gas Producers and Storage, and Storage and Use of Fuel Oil.

We feel that your Association with its upwards of a thousand membership, can surely on an individual basis exert a great influence in bringing about a general adoption of these various rules, not only so far as your own personal interests are concerned but in a more extended public manner where no doubt many of you take an active part in the affairs of your home government.

Another feature which the National Fire Protection Association has developed in connection with the matter of securing satisfactory devices is that of establishing a system of factory inspection service where these devices are examined in the factory where they are made, and when so examined are marked by a distinguishing or certifying label which announces to all that those particular goods conform to the so-called standard specifications. All insurance authorities are working together on this proposition, and I urge your co-operation in this feature in connection with the following devices in particular where this service has been installed and is in complete operation at the present time.

Electrical Devices.
Fire Doors and Fire Door Hardware.
Metal Window Frames.
Chemical Extinguishers.
Watchman's Recording Apparatus.
Fire Hose.

This system is being extended and will ultimately cover all fire protection devices and the purchaser, by means of the certifying label, is at once assured that he is obtaining a device which is considered the best in the market and furthermore he gets it at no increase in cost.

This feature is perhaps one which applies more especially to you individually, but there is also the opportunity here for using your influence to bring about a more general purchase and use of goods which are fully approved and certified to be the best obtainable.

CO-OPERATION.

In conclusion I wish to refer to one subject which in my estimation is the keynote of the situation, both specific and general namely, co-operation. The relationship between the insurer and the insured should be considered on a plane higher than the purely cold-blooded business basis. The insurance people should on their part give a liberal contract, should not be technical, should make rates as low as they possibly can so that they will receive only a fair profit on their investment, should pay their losses promptly, and should give to the assured the benefit of their experience in losses. The policyholder on his part should build his risk well, should equip it thoroughly, should care for it diligently, and in event of fire should do all he can to make the most salvage and thus lessen the loss.

Neither the insurance companies nor the assured can themselves alone bring about the desired end but only will this result come when both interests work in perfect harmony and with the fullest measure of co-operation.

The Use and Abuse of Automatic Appliances on Power Looms.

BY LOUIS SIMPSON, Valleyfield, P. Q., Canada.

In the proceedings of this Association will be found papers describing the benefits of certain inventions, of certain patented appliances such as warp stop motions, automatic filling motions and automatic shuttle charging motions, all invented for the improvement of the art of weaving on power looms.

These papers have chiefly been written by those interested in the manufacture or sale of these motions, and consequently any discussion which may have taken place on those papers was more or less confined to the particular motion or patents described therein.

These several motions have now been in operation long enough to permit the whole question of the use and abuse of such motions being carefully and thoroughly discussed, and this without any reflections being cast upon the motions patented and placed upon the market by any one concern.

The scarcity of skilled weavers, combined with the largely increased wages paid those weavers, makes the operating of the weaving department of peculiar interest to those engaged in the manufacture of cotton goods. Therefore a free and full discussion of this question must, of necessity, be of great interest to those engaged in the cotton trade.

In Great Britain the aim of inventors during late years would seem to have been confined entirely to the perfecting of the details of the style of power loom designed and built so long ago as the middle of the last century, the particular Mecca these inventors seemed to have in view

being the securing of such improvements as would enable a weaver to increase the weekly production of such number of looms as custom had assigned to him or her to take charge of.

The reasons that have governed the British inventors are obvious.

Customs die hard in European countries.

The basis of cost used in many concerns has for years been calculated upon the actual weekly wage average of the looms. The average of the loom was the criterion by which a concern was known as a good shop or a bad shop.

The weavers' wage being governed by a standard list, the unions were suspicious of and fought against any deviation from that list.

The extensive manufacture of sized goods and of goods which require the weaving of headings, which took up more or less of the weaver's time, and a hundred and one details which do not exist on this continent, all tended to confirm the English inventor in trying to perfect the details of the loom then in operation, rather than to seek to invent a loom built on different lines, and in the operation of which a saving would be found by a weaver producing more goods through attending to more looms.

The position might be briefly summed up as follows:

The English inventor was seeking to increase the production per loom.

The American inventor was seeking to increase the production per weaver.

The extended use of ring spun yarn in the States, combined with the continued scarcity of skilled weavers, encouraged the research of the inventor on this side of the Atlantic, which culminated in the results obtained by the inventive genius of the experts associated with the Draper Company of Hopedale, Mass., who have since been followed in the same line by many other inventors.

In England the officials of the Operative Weaver's Union claim that under no conditions can the application of a warp stop motion to a loom be of advantage to a weaver, and further that although the use of a good warp stop motion will secure the production of more perfectly woven cloth, yet, in their opinion, the weaver can neither attend to more looms nor produce more work off the looms than was produced before the motion was applied.

On this side of the Atlantic it is now generally admitted that when weaving certain descriptions of cotton goods a weaver can produce more work from looms on which a good warp stop motion has been applied, than could be done without the aid of the stop motion. More especially is this the case when weaving those descriptions of cotton goods in which the existence of the fault known as "ends out" is a matter detrimental to the sale value of such goods. To produce perfect cloth it is absolutely necessary, even when weaving good warp yarn, that the quantity of looms operated by the weaver should be limited, so that the weaver may be able to visit each loom under his or her charge at frequent intervals. Whereas, were the looms supplied with a stop motion, the weaver is able to rely upon the stop motion to prevent the loom continuing to make cloth when any of the numerous ends which compose the warp have become broken.

To intelligently discuss the use and abuse of the several motions now upon the market it would seem to be necessary to lay down axioms, so that the discussions may be kept within bounds.

The following axioms are submitted:

(1) Warp stop motions are particularly adapted for the weaving of cloths which are sized for weaving purposes only, and where the warp yarn used is not finer than 60s counts, and where the number of ends in the reed does not exceed 70 ends per inch.

(2) The use of stop motions is not adapted for cloth, the warp yarns of which are heavily sized or the warp yarns of which are of inferior quality, or the warp yarns of which are yarns finer than 60s, or where the number of ends per inch in the warp exceeds 70.

(3) The filling changer is peculiarly adapted to the weaving of cloths in which the filling is spun upon the ring frame, in which the filling is of counts coarser than the 40s and for the manufacture of cloths where a broken pick, a broken pattern or a "slub," is not considered to be detrimental.

(4) The filling changer is not adapted for the weaving of cop spun yarn, for the weaving of filling of inferior quality or when specially spun with little twist known as soft spun filling, or for the weaving of counts finer than 50s, nor is it adapted for the weaving of cloth where broken picks, broken patterns, "slubs," thin places, thick bars, are considered to make the cloth unmerchantable. It is true that an invention called a filling feeler has been placed upon the market, but there are objections to the use of this invention which some state make the invention commercially impracticable.

A filling changer loom requires a satisfactory warp stop motion to make the loom practicable.

Besides the filling change loom a loom is built in which the shuttles are changed. It would appear that this motion is more adaptable to the use of cop filling, and especially cop filling of fine counts, and to manufacturers producing cloths containing such filling these looms are interested.

Under the head of abuse might be instanced the use of warp stop motions upon looms weaving cloths which contain a large number of ends of warp per inch. Also might be instanced the weaving of cloths containing very fine warp.

It is not claimed that it is impossible to weave such cloths, but that the disadvantages experienced in the use of the stop motion upon such cloths almost, if not quite, counterbalances the advantages, so that there is not an economic return upon the investment.

In the automatic appliances for changing the filling it is advanced that when looms supplied with these appliances are weaving fine filling, and especially fine cop filling, the disadvantages experienced outnumber the claimed benefits.

A Few Suggestions on Merchandizing the Mill's Product.

BY FREDERICK B MACY, New Bedford, Mass.

There are as you know two usual and well defined methods of selling the mill product:—By the

commission house that sells the whole or practically whole product and by the mill selling direct through the brokers.

The selling of the product is one, if not the most important factor in determining the success or failure of a mill and necessarily calls for the deepest thought and consideration.

The commission house system, which is probably the largest, has been attended with much success in many instances where the house has a large and efficient selling force and with the help of trademarks and judicious advertising; but I believe it is becoming more and more the policy of the mills to keep control of their output and thereby balancing the product so as to run on styles and numbers of yarns that they are best adapted to make.

The selling house in times like what we are enjoying at present has no difficulty in disposing of the whole product, but in times such as I have known and the mill tries to dispose of a portion of its product by contract in the grey, they find a great difficulty, as the converters look upon them as competitors and prefer to place their orders with the mills that do not convert their own product.

The making of goods on contract is the system with which I have to deal, and it is one which seems to me to afford several advantages.

This is an age of specializing, and many houses who convert sateens, linings, etc., do not handle other goods. Then the white goods houses who handle only lawns, India linens, etc., others have departments handling only shirtings, others dress goods and others printed lawns.

Now all these houses or departments have their perfected selling force who cover the special trade, and they also send men to Paris and other places in Europe who are constantly getting up new ideas, and when they look for a mill to make the product they try and find the best mill adapted to make the fabric.

Here is where the broker comes in and can be of great assistance to both buyer and seller. With this large field the mill cannot only pick out the goods they are adapted to make, but those that give the largest margin of profit.

It is also getting more and more the custom of the mills to ask who the goods are for before making prices, as it makes a difference to the mill through which channels the goods reach the customer.

It is also important that the mill should know for what purpose the goods are to be used, and here is a chance for the manufacturer and converter to get in closer touch with each other.

To illustrate,—we once received from a customer two pair of corsets, showing that in the severe strain they had been subjected to by the buyer, who evidently tried to look very slim when nature had ordered otherwise, they had ripped where the fabric had been stitched.

We did not know when the goods were made that they were intended for the purpose, and we called the attention of the buyer to the breaking strength as shown by our testing machine, and that the two ply, high sley warp was three times as strong as the single filling, and the garment had been made up where the strain all came on the filling. You would naturally think this would have been discovered by the manufacturer, but evidently it had been overlooked or the appearance of the fabric was the object aimed at; for if the goods did not cut to advantage reversing the construction would overcome the difficulty.

We once made a good-sized contract of high count goods which we found afterwards were used for typewriter ribbons. We also made a sample of such a fabric for an importer, but no order came from it, and about eighteen months later a manufacturer of typewriter ribbons came to the mill with a sample of the cloth we had made and wanted to know why we could not make the cloth stronger. He said that as far as smoothness and evenness of yarns and perfection in weaving were concerned, it was superior to the English goods he was using. He supplied me with the grey foreign sample and having it dissected we found the yarns were much harder twisted.

This was a new one for us as we had not been told that this was one of the requirements.

Now to make a special hard twisted yarn was easy enough, but I explained that we should want to run the goods continually if even a small delivery was wanted, as the yarns would have to be kept separate. I found this was just what he wanted as he explained that in order to keep his factory supplied without interruption from delayed or lost shipments, he had to carry a large stock of the goods. Therefore, I say it is important that the customer should get closer to the manufacturer, and if they will go to the mill with their problems they will be met more than half way.

It is not fair to either buyer or seller not to do this, and I cite these instances to show that under the system of ordering goods through a broker either by sample or from description the converter as well as the manufacturer is working in the dark and that a closer relation would be of mutual advantage without disturbing the middleman or manner in which the goods are sold.

I think most of the fine goods brokers are now disposed to bring the two together, and he is or should be able to advise where the fabric can be procured, and is a real help to the purchaser as well as the mill, and in fixing the price knows approximately what the goods should cost to make and sell for and is a fair and impartial medium through which to trade.

Quality as you all know helps a lot in selling goods. The merchants or most of them try to build up their business on quality and reputation, and it is up to the mill to set a high standard and live up to it.

Among these merchants you will find high minded, conscientious business men, and in times like these when demand for the product is good, it is a good time to make mutual and satisfactory business connections and if you can please them with the goods, give them what they buy as to quality and delivery and establish a reputation for reliability,—pleasant, confidential and lasting relations will surely follow. Business to be satisfactory must be mutually so, and the backbone of all business is confidence.

It may be for some reason you cannot always commence a contract just on time, but I have found them as a rule reasonable and willing to meet you half way if you have any reasonable excuse. Those given to short cuts and sharp practices can be left until business compels us to sell them, and there is never any trouble to sell this class if you care to take the risk.

CORRESPONDENCE AND NOTES

Upon Textile Topics At Home and Abroad.

THE LAWRENCE LOOMFIXERS' SCHOOL.

Lawrence, Mass., Sept. 14, 1907.

Editor Textile World Record:

The strongest argument in favor of a textile school in Lawrence is the fact that the loomfixers of Lawrence have supported a school for the last ten years for the instruction of its members in designing, weaving, loom construction, yarn and cloth calculation. The history of the school shows how eagerly technical education is sought by the textile workers.

On May 5, 1891, thirty of the Arlington Mills' loomfixers met and formed a union. It was voted that the organization be known as the Lawrence Loomfixers' Association, and an invitation was extended to all loomfixers to become members of the association. Permanent quarters were obtained and very instructive and entertaining papers on loom construction and weaving were contributed by members and boss weavers. From the very first the union was a school.

On April 6, 1897, the meeting place was changed to Caledonian Hall. A committee of ten was appointed to canvass the city and its vicinity to induce all loomfixers to become members, as the association was about to start a school for instruction in designing and weaving. The committee met with great success, showing the need of textile education. Then a second committee of six was appointed to procure a loom for the instruction of the members. The committee reported that Overseer Hardy of the Arlington Mills would present the association with a combination power and hand loom. Through the efforts of the same gentleman the Arlington Mills loaned a Knowles box loom to the school.

On September 6, 1898, suitable rooms were secured and the formation of a textile school was well under way. The Pacific Mills, through Agent W. E. Parker, presented the school with a Lowell witch engine loom. A Northrop loom was received from the Draper Co., a dobby loom from the Crompton & Knowles Loom Works. Belting and strapping were received from the Leland Belting Co., E. E. Burnham and F. W. McLanathan; pulleys from Samuel Smith and J. W. Barlow; reeds and harnesses from the Emmons Loom Harness Co. and Thomas Clegg; bobbins and shuttles from the Draper Co. and the Brown & Abercrombie Union Shuttle Co.; warp and filling came from the Atlantic Mills. Mayor James H. Eaton gave a revolving blackboard, yarn reel, yarn scales and case and an electric motor. Textile books and papers were also supplied from various sources.

A principal and secretary were chosen and a board of directors elected, the formal opening on Saturday, February 25, 1899, being largely attended. Mayor Eaton made a very interesting address after which power was applied and the Loomfixers' Textile School was a reality. Classes were formed in designing, weaving, loom construction, yarn and cloth calculation and were taken advantage of by a large number of members.

Matters went along smoothly during the following summer, but when the fall classes were formed the ownership of the building changed hands and the association was obliged to vacate as the new owners wished to occupy the building. Wishing to be secure against further evictions the association decided to obtain a building of its own. Land and building were purchased, the building remodeled inside and out, and the Lawrence loomfixers had the proud distinction of being the only labor union in New England to own its own home. The looms were placed in position and again the school was in good working order. The Board of Directors arranged with Will Nelson, the head

instructor of weaving in the Lowell Textile School, to deliver lectures in weaving and loomfixing. Many other prominent instructors spoke before the union. Most of the instructors were members of the union. Classes ranged from sixteen to twenty, each member paying twenty-five cents a lesson.

The hall and school have been and are opened every evening, Saturday afternoons, and Sundays. The union is trying to purchase an adjacent piece of land in order to have more room for the school.

This school stands today a monument to the Loomfixers' Union of Lawrence. The union stands ready to open the school to the public. It is the intention to add new courses this fall and make a vigorous effort to broaden the scope to meet the immediate needs of the large mill population in Lawrence. Why should not this institution be made the basis for a comprehensive textile school?

WILLIAM H. DOOLEY,
Instructor in Chemistry and Mathematics in the Lawrence High School.

A COMBING MACHINE.

An attachment to a combing machine, recently patented, is intended to prevent air drafts around the detaching or piecing rolls. a side elevation. The inventor states that the draft of air generated by the revolving

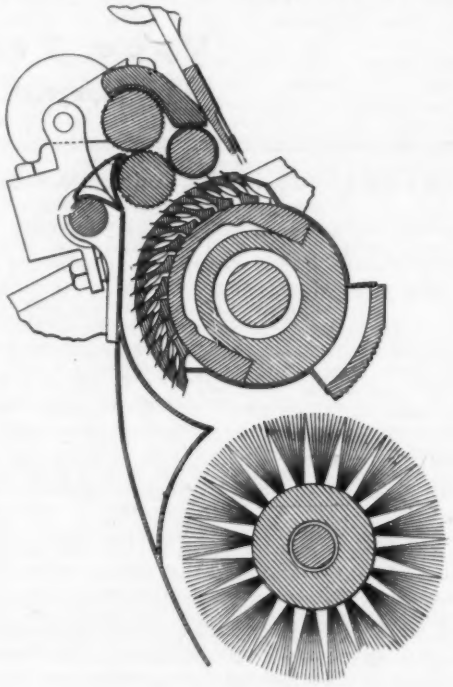


FIG. 1.

combing cylinder has hitherto escaped from the cylinder inclosure through the gap above

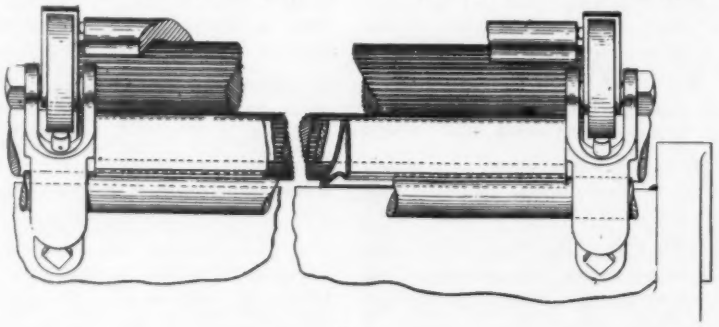


FIG. 2.

The open space between the rolls and the waste chute is closed to prevent the lint from blowing through the space and being carried into the room and on to the combed sliver. The new construction is shown in the transverse section of a Heilmann combing machine, Fig. 1, and at Fig. 2, which is

the waste chute, and in high speed machines is found to have an injurious effect upon the sliver and is otherwise objectionable. This air current is due to the practically complete inclosure of the upper part of the combing cylinder, by the segment-engaging roll and the lower piecing roll which

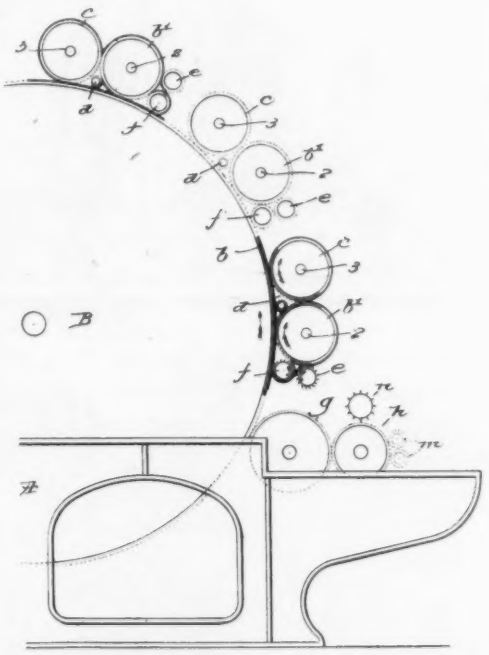
are in contact, and also by the other apparatus shown in the drawing. All of which has the effect to create a region of air pressure within the waste chute and just below the lower roll.

With this new attachment the air draft is obstructed by a guard, shown made of sheet metal, bent into the shape of a triangular prism and combined with the parts of the machine so that it spans the supporting member and the lower piecing roll, resting on both. It has a part which is bent inwardly or downwardly toward or into contact with the top of the waste chute, so that the space between the top edge of the chute and the bottom of the roll is closed or at least so that the draft of air is reduced or deflected away from the combed sliver. The portion of the guard which is in contact with the roll may be furnished with a facing of soft material like felt which wipes or cleans the roll of the loose combings which collect upon it. The guard or clearer extends the full distance between the horse tails and is removable without difficulty for cleaning the felt facing. The upper face of the guard, when mounted in position, affords an apron or chute upon which the combed sliver travels as it emerges from the rolls.

A WOOLEN CARD.

A new arrangement of workers and strippers on a woolen card, shown in the illustration, has recently been patented in this country. The stock is taken from the main cylinder by the worker and before it is returned to the cylinder is carded by a stripper. The workers are arranged in pairs. An extra carding roller connected with the first pair of workers runs at a faster speed and gives the stock an extra carding before the material is returned to the main cylinder by the stripper. The inventor states that practically all the stock on the first worker is removed before the teeth of the worker again came in contact with the stock on the main cylinder, so that the worker cards the stock on the main cylinder in its most effective condition.

A represents part of the frame work of a carding machine; B, the usual main cylinder having card clothing, b, and revolved usually seventy or more times per minute. The teeth at the point of contact with the main cylinder move in the direction of the movement of the more rapidly revolving main cylinder, the surface speed of the worker, b′, being a little faster than the speed of the second worker, c, the workers traveling at a very much slower surface speed than the main cylinder.



The center stripper, d, in the space between the two workers and the main cylinder, strips from the rear side of the first worker, b′, the stock taken from the main cylinder, and returns it to the main cylinder to be recarded. The second worker then takes a part of the stock from the main cylinder and after carding it carries it over and about the second worker. The first worker strips the stock from the second worker and carries it backward toward the end of the machine at which the stock is fed to the main cylinder by the usual tumbler.

The twice carded stock on the first worker, b′, is again carded before its return to the main cylinder through the stripper, f, by a carding roller, e, located at the front of the first worker, the stripper taking the

stock from the first worker and carding roller and returning it to the teeth of the main cylinder.

Each pair of workers, its central stripper, d, stripping the rear side of the front roller, and the carding roller and stripper at the front side of the first worker card the stock three times and return it to the main cylinder.

strip from the first worker practically all of the stock in the teeth.

The drawing shows in the space between the first worker and carding roller and stripper, the film of stock as it is removed, and also the stock stripped from the first worker by the stripper being applied to the under side of the stock taken from the first worker by the carding roller.

FIG. 37. FIG. 38. FIG. 39.

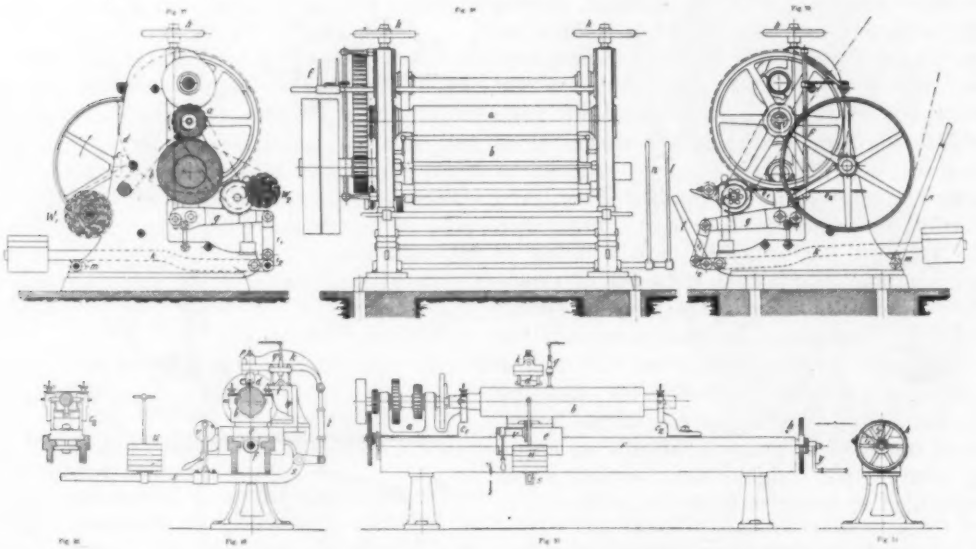


FIG. 52. FIG. 49. FIG. 50. FIG. 51.

The drawing shows a lickerin, h, in advance of the tumbler and feed rollers, m, m, and a bur guard, n, to be used for wool, but the machine is applicable for any staple capable of being carded.

In practice, about half the stock applied to the teeth of the main cylinder is taken off by the first worker. The stock is stripped from the first worker and again applied to the surface of the stock yet in the teeth of the main cylinder, from which it is again taken by the teeth of the second worker. The first worker takes the stock from the second worker, cards it, and brings the stock opposite the teeth of the carding roller, e. This roller takes the greater part of the stock from the first worker and that stock is stripped from the carding roller, e, by the stripper, f, the latter stripper also acting to

SILK LUSTER ON COTTON CLOTH.

BY PROF. HUGO FISCHER, Dresden.

From Zeitschrift fuer Textil-Industrie.

(Continued from September.)

LUSTERING MACHINES.

Embossed calenders with two or more rolls are used to impart the luster to the goods. The hollow steel printing roller is 10 to 14 inches in diameter, with a working width of 40 to 80 inches. The surface is raised or depressed according as the surface of the cloth is to be depressed or raised. In the cavity of the cylinder are placed a row of gas jets which heat the roll to about 580° F. The printing roller works with paper rolls of the same length and 20 to 24 inches in diameter. The pressure is obtained by hydraulic

presses or by an arrangement of weights and levers. An attachment is provided by which the roll can be relieved of the pressure almost instantly. An hydraulic press gives a pressure of 120 atmospheres.

The circumference speed of the rolls varies between 5 1/2 and 6 1/2 inches per second.

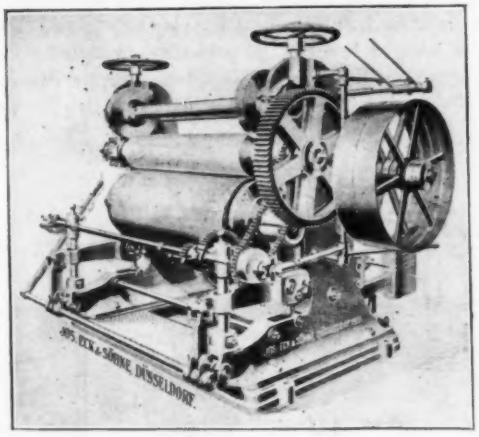


FIG. 40.

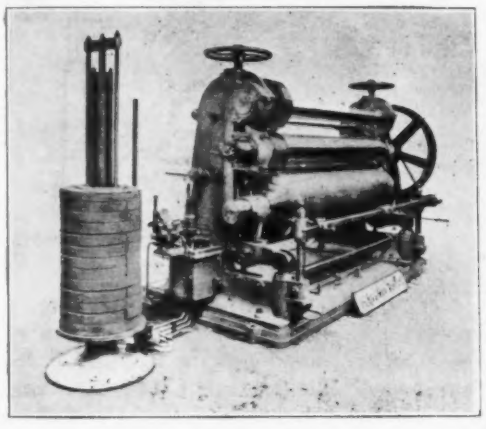


FIG. 41.

The printing roll is driven positively and drives the paper rolls by friction. A roll of cloth is placed on the back side of the calender and connected with an adjustable friction device. It passes over a guide roll and spreader between the pressure rolls and then is wound on a roll in front of the machine. The winding roll is driven by a friction coupling connected with the embossed roll shaft. Tests on a calender with an embossed roll, 68 inches wide and 14 inches in diameter, showed that the pressure was spread over a width of 5/8 inch. The paper roll

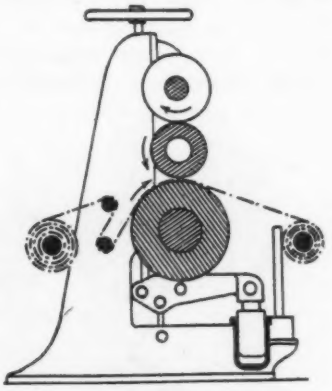


FIG. 42.

under the embossed roll rests directly on two hydraulic presses, each having a piston diameter of 7 1/4 inches.

Figs. 37, 39 and 40 give perspective and sectional views of a two-roll silk finished cal-

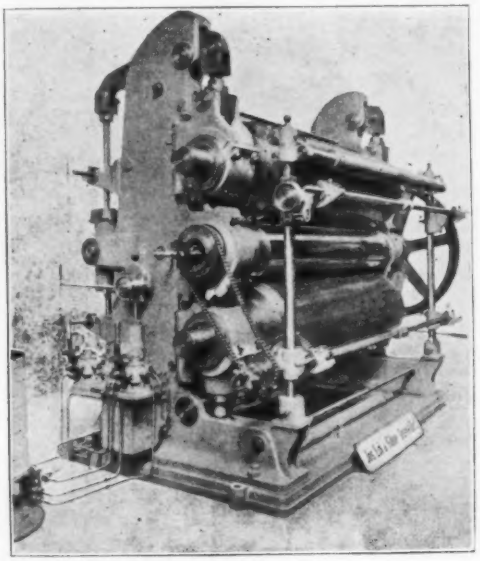


FIG. 43

ender built by Jos. Eck & Soehne, Duesseldorf. The printing roll, a, is driven by two gears, c. d, and a tight and a loose pulley, the ratio between the gears being 20 to 130.

The speed of the driving shaft is 66 r. p. m. A hand level, e^1 and e^2, reaches from the front of the back side of the calender for shifting the belt. The paper roll, b, rests in open bearings which are adjustable by a hand wheel, h. A knee joint, i^1, i^2, connects the front end of this lever with the lever, k, which carries at one end a weight of 20 to

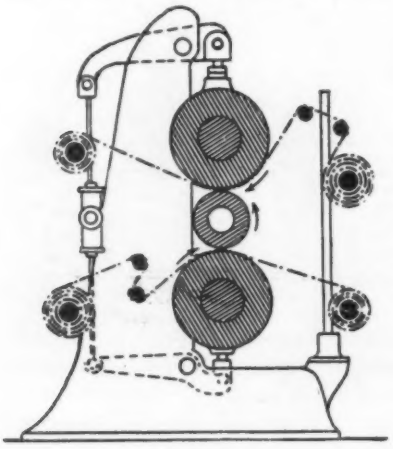


FIG. 44.

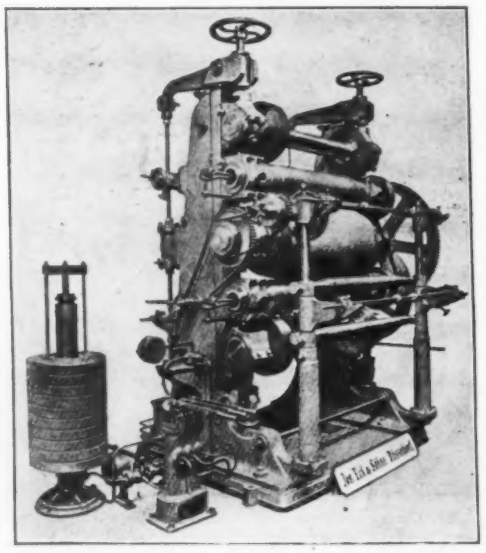


FIG. 45.

26 pounds. The levers are so arranged as to give an average total pressure of 24 tons. With this pressure on a roller 10 inches in diameter a pressure of 190 atmospheres is obtained on the cloth.

Fig. 37 shows the adjustment with the pressure on the rollers. Fig. 39 shows the machine with the rollers relieved of the pressure. This change is effected by a hand lever, l. When the lower roll is lowered, the weight lever rests on a support, m, which is fastened on a shaft and moved by the hand lever, n. Figs. 41 and 42 show a machine in which hydraulic pressure is submitted for the weight levers. A pressure cylinder connected with a pump supplies the necessary pressure to the rolls. The cloth to be

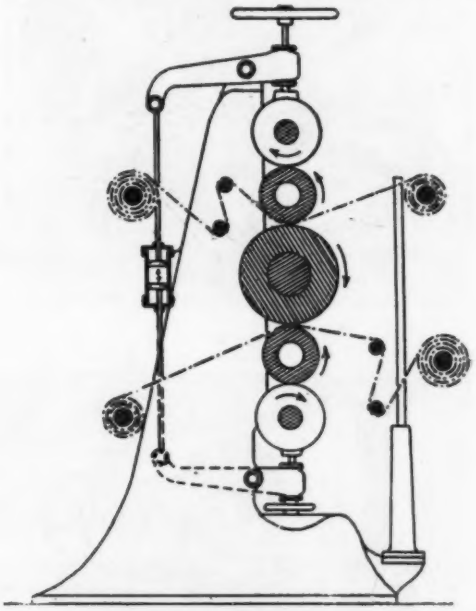


FIG. 46.

pressed is in the form of a roll, w^1, Fig. 37. The press rolls draw the cloth from this roll which is connected with an adjustable friction device. The cloth is rolled on wooden rollers about 3 inches in diameter and driven by a square shaft fitting into the end of the wooden roller in the usual way. The wooden roll runs about 40 revolutions per minute and this gives to the cloth a speed of about 6 inches per second. An increase of the speed by reason of the increase in the circumference of the cloth roll is prevented by a friction device, q, Fig. 39.

The same firm build a double silk finished calender, shown at Figs. 43 and 44 which handles two widths of cloth at the same time. The embossed metal roll is between

two paper rolls to which hydraulic pressure is applied. This method of applying the pressure has been patented by the builders of the machine. It consists of two double arm levers, the free ends of which are connected with piston rods at the end of which is a hydraulic cylinder enabling the rods to be lengthened or shortened to increase or diminish the pressure.

1 1/4 to 2 inches in diameter. The circumference of the printing roll must be a multiple of the circumference of the milling roll. Figs. 47, 48, 49, 50, 51 and 52 show the ordinary construction of these milling machines.

The pressure at which the milling machine works averages 700 to 900 pounds, and is varied according to the hardness of the steel and fineness of the pattern to be cut.

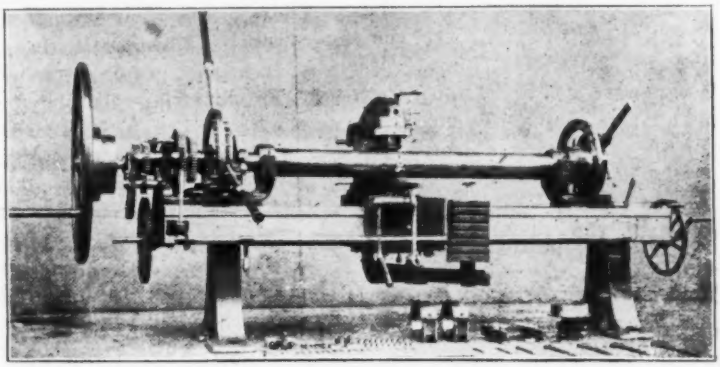


FIG. 47.

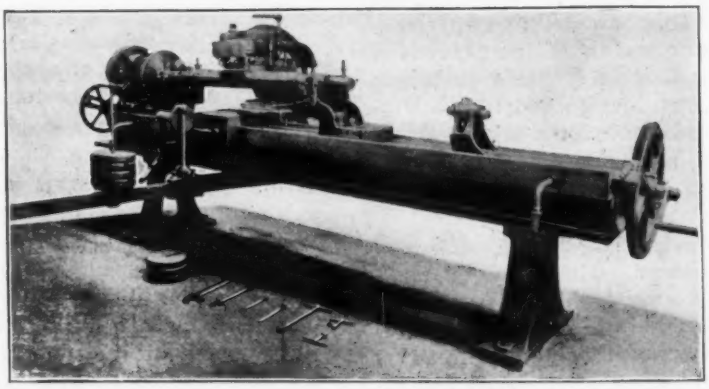


FIG. 48.

Figs. 45 and 46 show another form of the calender by which two pieces are printed with different designs at the same time. The operation will be clear from the illustration.

A calender of another form has been invented by Hantke von Harrtaus of Berlin by which two designs can be pressed on the same piece at one operation. For example, the cloth can be pressed with lines running in the direction of both warp and filling.

The pattern is cut on the metal roll by a milling machine having a hardened steel roll

The value of the textile manufactures imported into Great Britain in 1906 was $201,879,000; the value of textile manufactures exported for the same period was $712,585,600.

It is stated by the London Times that the acreage of indigo planting in India increased to 453,000 acres in 1906-7 as against 384,000 in 1905-6. The total Indian production is estimated at 69,700 hundred weight of 112 pounds each.

ENGLISH NOTES.

(By Our Special Correspondent.)

It is told with some authority that khaki for British military uniforms is doomed. A more protective coloring—dark green is suggested—for the wear of all troops likely to soldier in green fields will be adopted.

* * *

Shades of violet, blue or plum are the probable favorites for the winter clothing of both sexes. Women are still for tartans, for zibeline cloths and face cloths in rich purplish coloring with or without a touch of tartan striping. In men's suitings a disposition is apparent to replace light stripes by threads darker than the ground of the fabric.

* * *

Dressmaking is fast getting into the hands of the factory ladies' tailor. Material in lengths becomes harder to retail and costumes factory-made to special measure, much easier. This is a development especially favorable to makers of dress tweeds of the cheaper varieties. It leads to larger quantities of single design and to a limitation of the number of cloths taken. Making-up is more profitable than simple jobbing of cloth and more jobbers of dress goods are going into this business.

Factory tailors are largely independent of the thread combine. They buy unglazed thread from cotton-doublers, getting it cross-wound on tubes. Astonishing disregard for the strength of their thread is shown. They look for level thread and especially for that which is cheap. Much of their sewing appears to be done rather to hold the garment together until it can be sold than until it can be worn. Thread that will work without stopping machines is reckoned good enough by many clothiers.

* * *

While so much is being said of undervaluation an incident directly within one's own experience may be recalled. There was, in the flush of the silk-seal trade with America, a German merchant in Bradford with means of his own for reducing dutiable values. His seal cloths were all put over the perch and wherever the slightest justification existed a string was tied to the list indicating a damage. Few of his pieces would have fewer than six or eight strings attached and many had more. Each representing an allowance of a quarter-yard the value of the expensive piece as a whole was very sensibly diminished.

These goods were shipped and invoiced to an agent in New York whose function was to perch the goods afresh, removing all superfluous strings before making delivery to the jobber. The plan worked perfectly, but it imposed upon the agent the business of reinvoicing the cloths and receiving the money for them. With $15,000 of the German's money in hand the agent disappeared from sight and has not been heard of since. There might be more undervaluing by English exporters had not two or three been trapped by plausible New Yorkers who refused utterly to pay the balance due under secret arrangement above the sum of the consular invoices. It would be a difficult thing now to persuade firms in Golden Square to hearken to any scheme of getting the better of the U. S. customs officers.

* * *

Time was when we had a tariff on wool entering England. It was in force at the time that Lord Liverpool told a deputation of woolen manufacturers that the recently established woolen industry in America was a "mere experiment" which would be "ruinous to those embarked on it." The tax was sixpence a pound; the equivalent of 8 to 15 per cent. on the higher sorts and of 20 to 100 per cent. or more on the lower. It prevailed from 1819 to 1824 when it was replaced by a duty of a penny.

Manufacturers never ceased to protest against a tax that was imposed by the agriculturists in their own supposed interest. It was shown that the due was detrimental to the export of cloth and it was claimed that the tariff made desirable wool cheaper to foreign competitors by curtailing English demand for it. A carpet-maker of the time argued strongly that the farmer lost by ill-judged protection. The export of cloth, he said, was in essence the export of a little

wool and a lot of corn and meat; the latter being the means of subsistence of the workers who had added a five, ten or twenty fold value to the initial purchase of raw material. So in addition to cheapening wool to foreign makers the duty was actually diminishing the home demand for the other produce farmers had for sale.

* * *

In the English worsted and woolen trade yarn-dyeing seems to be going out. Slubbing-dyeing is unmistakably coming in and piece-dyeing is increasing. To the satisfaction of dyers of wool slubbing they have had lately to dye more pale shades, like lavender, drab, slate and the like. Prices are lower than for full colors but not so much lower as is represented by the saving of dye stuff. Matches are more easily made and the same with corrections. To the piece-dyer a season of light colors is an unmitigated nuisance.

* * *

While there are manufacturers who look long at the price per pound of dye stuff, the commission-dyer looks rather at their proved value. He thinks of prices in terms of pounds or yards, classifying a black, say, as a one-cent or a two-cent black; this being the cost per pound of dyed material. This is determined from bulk dyeing, for laboratory estimates are found to be treacherous, and the precise value ascertained is kept from the color-maker as often as not. The cheapness in use of one make is made the instrument of bargaining-down the price of any competing make offered.

* * *

A feature of the finance of the Lancashire cotton-spinning trade is almost unique among English industries. Numerous limited liability mills rely for much of their working capital upon loans that are not specially secured upon assets. They proffer some 4 1/2 per cent. for call-money and 5 per cent. for time loans and receive advances principally from local investors. In the event of failure the position of depositors is that of trade creditors, with no priority. And it is remarkable that they do not insist upon mortgage debentures. The mill escapes the odium of a mortgage and, in good times, pays less interest upon loans than upon its issue of shares. The system seems to derive from the time when all large merchants and manufacturers were in a degree bankers and it is being disparaged now by investors' advisers.

* * *

There is something almost more than American in the readiness of some of our combines to close works. The Bradford Dyers' Association is as prompt to shut one work as to open another and the process is continuous. If two branches in similar trades are working at two-thirds of their maximum efficiency the business of one is transferred to the other and the necessary extension of premises is made. The enlarged concern has then to pay interest also upon its fellow. As many as four works have been transferred to one which in itself has been shut in the long run and its burden removed elsewhere. The effect is to ring the whole area with closed dyehouses which can be reopened when trade requires or let for other purposes.

The good will of the closed branch is not invariably let die. Vans, invoices and canvassers may come ostensibly from a works that is actually closed and is having its orders executed by some other plant. The fiction of the separate identity of the less important closed works is dropped soon. It is possible, however, to keep tradition alive and it is within the province of the directorate to say where work shall be carried on and trade-marks applied. The superstition that certain work can be done only in a certain place or by certain individuals is being destroyed and doubtless economy results from the quick transitions which are so unlike the accustomed way of English business.

* * *

Fashion in window-curtains is for neat, little curtains reaching half-way up the window, supplemented by hanging curtains for use as blinds. This has brought into being a considerable trade in cream colored cotton-warp lustre stuffs of the Sicilian type. Made from Lincoln, Yorkshire or Irish wools or mohair the fabric is dry and hard and fairly easily cleaned. A very high finish is not so requisite as for bright linings or dress goods

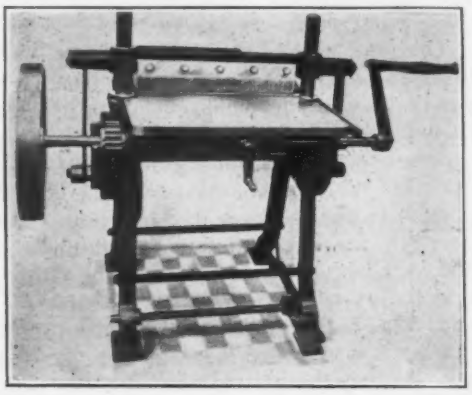
and to the inexpert finisher that is of advantage. Business has benefited in the fancy edgings necessary for casement curtains.

* * *

Cases of lead-poisoning of persons employed in handling dyed yarn have led to the framing of new factory regulations. Those who bundle and pick or twist into hanks any yarn dyed with a lead compound are to do so within reach of an exhaust draught strong enough to carry the dust away from the worker. Caps and overalls are to be worn and to be removed before any food is touched. The regulations as to nail-brushes, cloak-rooms and the like are on the lines of those for lead-glazers in the pottery industry.

* * *

Pattern-cutting machines which serrate or scallop the edges of patterns have attained great popularity in England. In February, 1906, the Textile World Record reproduced a pattern so treated. Cutting machines have



been in the meantime improved. A geared handle replaces lever arms, the operator is enabled to do all his work without change of station and he knows with certitude when the knife is through. Machines similar to that illustrated are to be had for about $100.

It is estimated that there are 150,000 cotton looms in Italy, with 5,000,000 spindles, giving employment to 300,000 people. Ten hours is a day's work, for which women are paid from 30 to 40 cents and men from 50 to 60 cents.

ADULTERATION OF STARCHES USED IN COTTON MILLS.

From a report by C. D. Harris, Assistant State Chemist, North Carolina Department of Agriculture.

Early in June (1907) two samples of starch were sent to this laboratory for examination. One sample was represented to be potato starch and the other corn starch.

The corn starch was found to be as represented, but very little potato starch was found in the sample represented to be potato starch. The product was mainly corn starch.

This led to the belief that perhaps a mixture of corn and potato starch was being sold for pure potato starch.

After some correspondence with the sender of these samples as to their price and use, it was decided to investigate the quality of the different starches offered for sale in this State.

With this object in view, the following circular-letter was sent out to about eighty weaving mills:

Dear Sir: We desire to make an investigation of the kinds and quality of the different starches used in cotton mills in this State, for the benefit of the cotton mills.

We would appreciate it very much if you will send us a 1/4-pound sample of each kind of starch used in your mill.

Please send in a sealed package, stating on the package kind of starch, name and address of manufacturer, your own name and address, or mill name and location, price per pound, and as near as you can the number of pounds used annually of the different kinds of starches in your mill or mills.

The replies showed much interest and a willingness to co-operate in the investigation. In a short while many samples of starch were received.

The samples were examined both chemically and microscopically, the following objects being in view:

First. To determine whether or not the starch was the kind it was claimed to be.

Second. To determine if any mineral matter such as talc, tremolite, ground soapstone, plaster of paris, or china clay, etc., had been added to give weight.

Third. To determine if there existed any difference in the gluten content of the different kinds of starch and different samples of the same kind of starch.

Fourth. To determine whether the samples were neutral, acid, or alkaline.

It is estimated that about 300 pounds of starch per loom are used in North Carolina annually.

There are 52,747 looms operated in the State; therefore, there are about 15,824,100 pounds of starch consumed by the cotton-weaving mills alone.

Reckoning the average price of all starch consumed at 2 1/2 cents per pound, it is found that about $400,000 is spent every year for starch in this State. The economical expenditure of so large a sum of money is worth considering.

FRAUDS PRACTICED.

The fact that it is impossible to tell the difference between different kinds of starches without the aid of the microscope, has been taken advantage of by some manufacturers or dealers to deceive purchasers as to the actual composition of the product.

How long the fraud of substituting a cheaper form of starch for a more expensive one has been going on we have no way of knowing.

How much money consumers of starch have lost by this deception on the part of manufacturers or dealers cannot be estimated.

The fact that 66 per cent. of the so-called potato starches examined were found to be mainly corn starch or cassava starch will give some idea of the magnitude of the sophistication.

This Department is willing and stands ready to be of any service it can to the textile manufacturers of the State to put an end to the adulteration of starches.

It does not mean to interfere in any way with legitimate trade.

PROPERTIES OF STARCH.

Occurrence.—Starch is one of the most widely-diffused substances in the vegetable kingdom, occurring more or less abundantly in every plant that has up to the present time been examined.

It is found in different parts of the plants, especially in the seeds of all the cereals and in the tubers of the potato, canna, and cassava.

Starch is found in varying proportions in different parts of the same plant. For instance, it is found in green leaves of all plants during the daytime; the proportion varying according to the weather and time of day. It is generally present in greatest quantity toward the evening and least in the morning, while during the night the starch completely disappears from the leaves, especially during the summer months.

Starch is also found in the pith of trees and shrubs and in the various woody tissues, but its presence in these parts, as in the leaves, is not constant, the same tissues at certain seasons being fully charged with starch and at others almost entirely devoid of it.

Nomenclature.—In this country the term starch appears to be applied generally to that obtained from all sources, with the name of the substance from which it is made usually prefixed to it, such as potato starch, wheat starch, rice starch.

In a few instances the affix "starch" is dropped, as in "sago," "arrowroot," or the product is known by some name given it in commerce, as "tapioca," etc.

Starch in Various Plants.—The per cent. of starch in various plants differs, as seen in table below.

	Per Cent. Starch.
Potato, air-dried	16-23
Corn	55-57
Wheat	53-56
Barley	38-46
Oats	27-38
Rye	45-47
Rice	75-77
Buckwheat	44
Tubers of Yam	25.2
Dried Apples	5.2
Dried Pears	10.3
Pease	38.0

Physical Characteristics.—To the naked eye pure starch presents the appearance of a white glistening friable powder, having a harsh feel when rubbed between the fingers, perfectly neutral, without taste or smell, is uncrystallizable and undergoes no change under ordinary atmospheric conditions.

Under Microscope.—Under the micro-

scope it is seen to consist of granules of various forms; the granules are in most cases perhaps more or less ovoid and differing widely in size, form, and appearance, dependent upon the source from which they are derived.

These starch granules may vary in size from 12,000 to 140 diameters per inch.

These wide differences are the principal means by which the various kinds of starch may be differentiated one from another as they occur in commerce.

It must be noted, however, that the size of the starch granules varies very greatly in different plants, being in some immeasurably minute, as in certain species of cacti; in others, as in the potato, attaining a comparatively very large size.

In the same plant and often in the same cell the size of the starch granules will be found to vary, being chiefly dependent upon the relative age of the grains, so that when measures of starch grains from various sources are given they must be taken only to represent an average; but although the dimensions of the starch granules produced by one species of plant are by no means constant, yet none of them depart very widely from the average, and so can be readily differentiated microscopically one from another by an expert.

DIAMETER OF THE COMMON VARIETIES OF STARCH GRANULES.

	Diameters per inch.
Tubers of Potato	180
Wheat	520
Corn	830
Tapioca	900
Buckwheat	2800
Rice	1250
Barley	1000

Under Polarized Light.—Starch assumes under polarized light a most characteristic appearance.

When examined with polarized light the field remains dark, but each granule assumes a glistening gray appearance, as if self- illuminous, and is marked with a black cross. If a thin plate of selenite be introduced between the polarizer and the objective while the prisms are crossed, beautiful chromatic effects may be obtained.

Chemical Properties.—Starch is insoluble in cold water, alcohol, ether, or any other known solvent.

Ordinarily air-dried starch usually contains 18 per cent. of water, which can be driven off by heating to 212° F. Under this condition starch appears to be a most highly hygroscopic substance which rapidly absorbs moisture from the air until it regains its original 18 per cent., and if exposed to damp atmosphere it is capable of absorbng as much as 35 per cent. of moisture.

Action of Heat on Starch.—Freed completely from moisture, starch may be heated to a temperature of 320° F., without undergoing any change; at temperatures higher than this it becomes colored and is partly converted into dextrine.

If ordinarily air-dried starch be heated to 320° F., it quickly undergoes decomposition, becoming converted into dextrine and reducing sugars.

Potato starch is entirely decomposed under these conditions.

Action of Hot Water.—When starch is brought in contact with hot water, the contents of the granules, owing to a large absorption of water, swell up enormously, and at a temperature varying according to the variety of starch, ultimately rupture the outer layer, forming a viscous liquid which is known as starch paste.

The different varieties of starch gelatinize with hot water at very different temperatures, as seen in the following table by Lintner, which gives the temperatures of complete gelatinization for the common varieties of starch:

TEMPERATURE AT WHICH COMPLETE GELATINIZATION TAKES PLACE.

	Degrees F.
Potato	149
Corn	167
Wheat	176
Barley	176
Rice	185

Under the action of boiling water the starch granules do not all swell up and burst

at once, the younger ones being attacked first, the older last.

According to Brown and Heron, starch which has been treated with dilute potash and acid in the process of purification produces a paste of less viscosity than the same starch which has not been so treated. They also find that immense variations in the consistency of the resulting paste are produced by slightly altering the manner of drying.

Thus starch which has been dried slowly and at a low temperature yields a more viscous solution than if dried quickly at a higher temperature.

From the manufacturer's point of view the viscosity of starch is most important, as the value of starch in certain industries depends entirely upon the viscosity produced by it when acted on by boiling water.

Potato starch is used in large quantities for the sizing and stiffening of yarn and cloth, so that it is of importance to the manufacturer to obtain that sample of starch which will make the stiffest cloth and which has the greatest tenacity.

Viscosity of Starch Important to Manufacturers.—If the viscosity of one sample of starch is 18 and the other 28, it means that it requires 28 pounds of one sample to give the same stiffness as 18 pounds of the other.

Action of Alkalies on Starch.—When starch is treated with an alkaline solution, the granules swell and form an exceedingly tough viscous mass.

Action of Acids.—A swelling of the starch granules similar to that occasioned by sodium, or potassium hydroxide is produced immediately by all mineral acids and by some organic acids—tartaric and citric—after being in contact for some time. No swelling is produced by acetic or oxalic acid, no matter how concentrated their solutions may be.

Chemical Composition.—Although starch from different plants has the same percentage composition (the formula being $C_6H_{10}O_5$ or some multiple), it is not one single substance.

Three isomeric carbohydrates occurring in varying proportions have been described:

(1) Granulose colored blue with iodine.

(2) Starch cellulose colored yellow with iodine, and

(3) Amylodextrine colored red with iodine.

True starch consists of granulose with a small amount of starch cellulose, and is colored blue by iodine.

Starch is converted into a paste by boiling with water, passing successively into soluble starch, dextrine, and dextrose on boiling with dilute sulphuric acid or hydrochloric acid.

By heating at 300° to 320° F., it is converted into dextrine. It is soluble in caustic soda or potash.

The chemist's report gives in detail the results of his tests of the samples received and from which we take the following abstract:

Sample	Sold as	Chemist's report.
1	potato	mostly corn and cassava
3	potato	mostly corn and cassava
4	potato	potato
9	potato	mostly corn
13	wheat	corn and wheat
21	potato	mostly cassava
26	potato	potato
37	potato	mostly corn
38	potato	potato
51	potato	mostly corn

Sixty-six (66) per cent. of the samples sent in represented to be potato starch were found not to be potato starch, but mixtures of different starches in which there was very little potato starch.

From the analyses just completed in this laboratory the average per cent. of protein and ash in the starches examined is as follows:

	Protein Per Cent.	Ash. Per Cent.
Corn starch	0.44	0.16
Potato starch	0.26	0.35
Cassava starch	0.23	0.34

It will be seen from the above that there is very little difference in the composition of cassava and potato starches.

The more protein a starch contains the more gluten it contains. Therefore, the higher the per cent. of protein in starch the higher the per cent. of gluten.

It will be seen from the chemical composi-

tion of corn and potato starches that corn starch contains nearly twice as much protein as potato starch.

This indicates that the gluten content of corn starch greatly exceeds that of potato starch.

Corn starch, having a higher per cent. of gluten than potato starch, makes a thicker and more viscous paste. Potato and cassava starches make a thinner paste which penetrates the cloth or fiber to a much greater extent.

The corn starches examined showed very little difference in chemical composition.

BACK STARCHING LINEN DRILLS.

BY HORACE KENYON.

Back starching linen drills is a difficult process. No sooner is one difficulty overcome than another arises that seems to be worse than all that have gone before. The machine should be operated by an experienced man as it requires very little to put it out of order. It also requires a man of experience to set it ready for starting, or it will result in a lot of spoiled pieces as well as a large percentage of remnants. The machine is constructed with one roll to revolve in a starch box, which must also have an agitator geared to the roll to mix the starch. On top of the roll are two brass blades called doctors, one on the back of the roll and one at the front. From the supports are two levers that are extended over the machine on their respective sides and carrying weights to regulate the amount of starch put on the goods. The back doctor is for this purpose and the front doctor for cleaning all surplus starch that is on the roll after it leaves the back doctor. On some back starching machines there is a brush placed over the roll around which the cloth passes after it has left the doctor. This brush revolves faster than the roll. If the starch is not too thick any surplus on the goods is brushed off. The cloth is kept tight and even underneath the doctor; this is very necessary to produce good work.

Back starched work also requires oscillating doctors; these are vibrated from side to side as the machine is running. There is a connecting arm to the shears, one on each side. These extend down to a cam that revolves as the machine runs. This action gives longer life to the roll and the doctors, and also prevents bare places on the goods, generally called grit marks, which look as if a pin or nail had been held against the cloth, leaving a straight mark. I have seen the cloth cut through when the piece of grit on the stationary doctor has been a little larger than usual.

Back starching machines are made with wood, rubber, cotton or husk rollers. I consider a good hard wood roller the most suitable as when it is run down and uneven it can be easily turned. This is more frequently necessary with drills than with other goods of a lower quality on account of the cloth being thick and the tendency of the selvage to curl. On some machines there is a brush over the roller as described. Others have a roller about four or five inches in diameter, or a copper cylinder about a foot in diameter with cold water running through. This circulation of cold water is necessary on very sticky mixings as the starch pulls off the goods and is transferred to the roll if the roll is not kept cold. I have seen machines built so that any one of these different attachments could be used as desired. Large mills generally have a machine for each class of work.

After the goods have passed through the back starcher they must not be allowed to fall in a heap on the truck. The machine should have a plaiting down rack, which is simply a straight board hung down from the carrying roller and vibrated by eccentrics like the plaiting down rack behind the driers. The movement of the board causes a resistance of the air that plaits the cloth neatly on the truck. This is necessary to prevent the starch being pulled out of the goods after they have passed through the machine.

We will now consider some of the difficulties in getting the starch evenly distributed on the goods. The starch may be an inch thick on one side and missing entirely on the other. There are two causes for this: First, the doctor may not be in line with the roll. If one side is a little further up the roll than the other it will cause this unevenness. Sec-

ond, the weights on the levers may vary and thus causes an uneven distribution of the starch on the back side of the goods.

Grit marks can be prevented by straining all the ingredients through a fine wire sieve before entering them in the tub, thus ensuring a fine smooth compound free from all refuse. The oscillating doctors also help to prevent this trouble.

Another difficulty is curling of the selvages. This trouble is very common on drills, especially if the goods are woven with tight selvages. This can be overcome to a certain extent by placing the spreader bar as near the roll as possible, giving the selvage no time to curl after it has left the bar before being held flat on the roll. This is about the worst trouble of all. When the selvage is curled as it passes under the doctor it lifts the doctor up too high and allows too much starch to pass on the goods, while the part that is curled up inside gets no starch at all.

In running linen drills through the back starcher it is advisable to have the goods on rolls in front of the machine. Have a brake attachment so that all the necessary tension can be applied, especially if the goods are being run dry. It always requires more tension to hold the goods tight to the roll when they are dry than when they are wet. If the goods are to be run wet quite a few tension bars are required and it is well to put down a vibrating roll in front of the mangle with springs underneath to prevent the goods pulling too tight and breaking off. As the cloth pulls tight the bottom tension roller lifts up and when the pull is over the springs hold it down in its place. I have found this to work well on my machines as it ensures a steady, even pull all the time the machine is running.

According to the Bureau of Statistics the United States sent to Japan in 1906 raw cotton valued at $11,083,797, and cotton piece goods valued at $75,573.

The exports of cotton cloth from the United States to Brazil in 1906 amounted only to $590,007, out of a total importation of about $16,000,000.

THE ELECTROLYTIC TREATMENT OF FIBRES.

BY JAMES STRAND.

Strong curiosity has been aroused in Yorkshire by the preliminary announcements of a new method of sterilizing "dangerous" wools and killing the anthrax germ. Harry Hay, a Dewsbury chemist, hit upon the discovery while searching for improved means of carbonizing rags and eliminating the coloring matter. Fuller disclosure is suspended until patents have been secured, but enough has been told to indicate the mode of operation. The method involves electrolysis, a system which, if not new in textile working, is unusual. That is to say, he uses a solution which is capable of decomposition by the passage through it of a current of electricity. The electro-plater's bath is the standard example of electrolytic action used in the industrial arts. In that bath a solution is split into its elements, some of which are deposited at one pole, some at the other, the gases escaping through a liquid of unstable composition between the anode and cathode of the electric circuit.

Electrolysis has been used in cotton bleaching and has proved a somewhat costly failure. It is to be used in a plant at Bradford for degumming ramie. Persons interested say that the powerful natural gum, which is the most inconvenient obstacle in the way of the employment of ramie, may be reduced by electric action to a condition in which it is soluble in water. This information is given without prejudice and by way of showing what current expectations from electrolysis are. Other workers, like Dr. Eurich of Bradford, have independently been trying the effects of electrolytic action purely with the aim of disinfecting wools, and they are hopeful of the result. But they do not hold out hopes of sterilizing wool in the unopened bale. That feat has not yet been performed and hardly can be done until the bale has been wetted to its centre in order to give the electric power free passage. Hydraulic or vacuum plant for that purpose must needs be expensive and the alternative to use of that is to open the bale under water

containing an effective germ-killer. If disinfection be possible in that way one may ask what is the use of an electrolytic plant at all, so far as concerns simply germ killing.

A plausible reply to that inquiry is based on the well-ascertained chemical fact that elements in their nascent state are extraordinarily active. Oxygen, when it is being generated, is more effective in oxidizing and hydrogen is more potent in reducing, than are the same gases after they have been produced. In electrolyzing the agent is used at its most vigorous stage and this may be of importance in getting rid of the bacillus of anthrax. W. Rhys-Davies announces that black shoddy and all wools may be sterilized by passing a fairly constant voltage through a solution of hydrogen peroxide and sodium chloride. The one ingredient is the well-known bleaching agent and the other is common salt. Decomposition will probably be attended by the formation of sodium hypochlorite, and the liberation of active gases. But it is to be assumed that as the carbonization of vegetable matter and the destruction of dye was Mr. Hay's objection—a different solution was used by him. What was used is not known, but it is significant that a claim is advanced to use acid in a weaker form than hitherto and thus to avoid "tendering" the woolen material.

A solution that is almost too drastic is made with bichromate of potash, acidulated with sulphuric and a little nitric acid. This attacks vegetable matter and dyestuff and speedily gets rid of them, leaving the woolen remainder of an amber color. Whether this is employed in a weak form electrolytically, or a simple sulphate or other salt, is yet to be determined. It is claimed that the treatment costs less than do the precautions enforced by the Government for handling suspected wools. Admittedly experiments have not been made upon materials in bulk, but all concerned, including men high in science, appear to be satisfied with the results obtained in sterilization.

The imports of leather gloves into the United States during 1906 amounted to $9,196,398, an increase of about 33 per cent. over 1905.

PLAN OF A WOOLEN MILL.

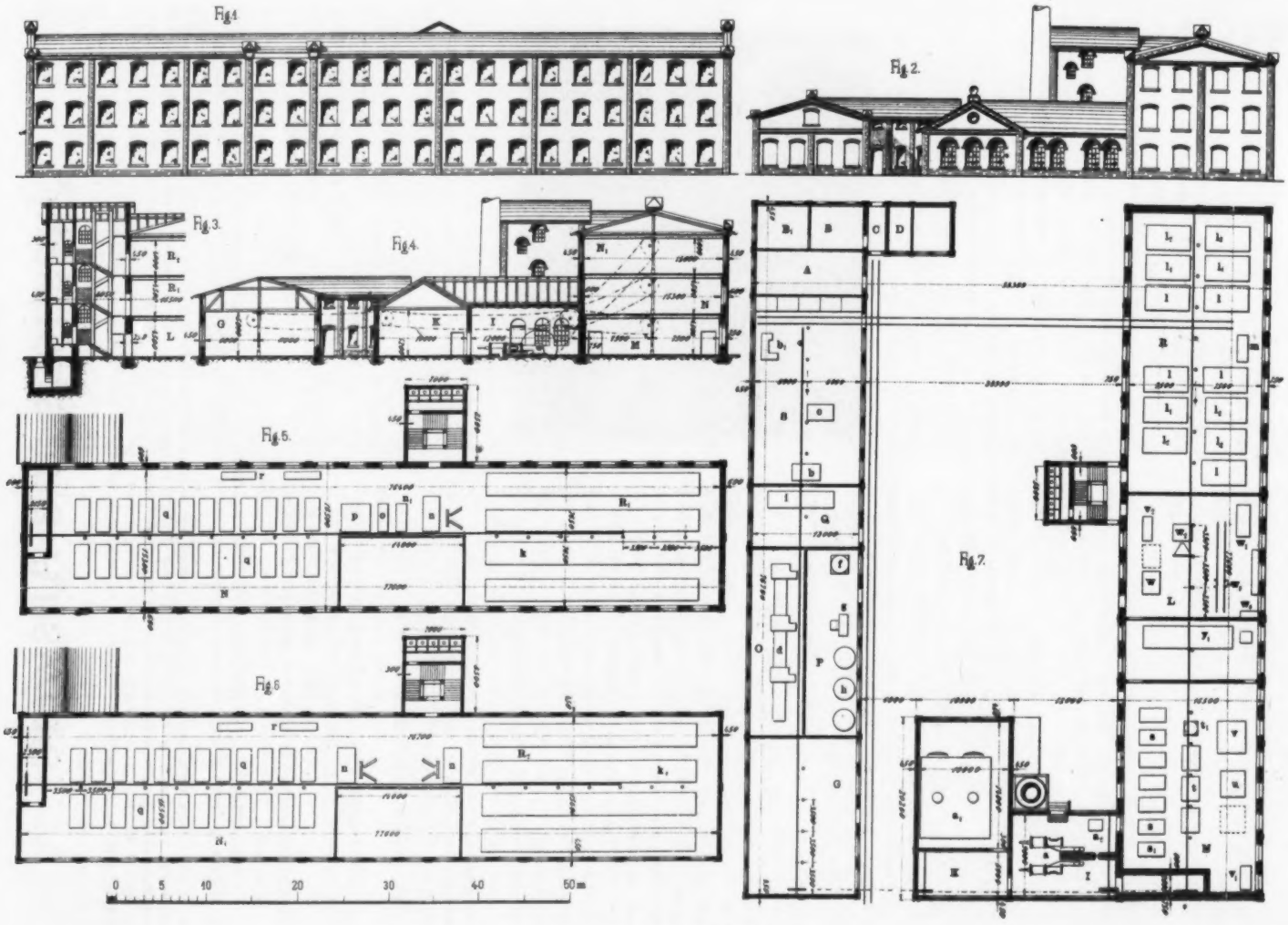
In our May issue we published a plan of a one-story woolen mill designed by G. Josephy, of Bielitz, Austria. This month we give a plan of a three-story woolen mill planned by the same firm. The same letters are used in the two plans for indicating the respective rooms and machinery. In the three-story mill the method of transmitting power for the engine is necessarily changed; a special arrangement has been adopted for driving the machinery in the dye house. The engine in room, I, drives a jack shaft from which are driven the main shafts on the three floors as well as a counter shaft in the repair shop, K. From the latter the shaft in the dye house is driven.

The main building, 54 feet wide, is located on the north side of the mill yard. Running south is the machine shop, I, and the boiler house, a', with the repair shop, K. A passageway 20 feet wide separates the boiler house from the building on the south side of the lot. At the end of this building is the watchman's room, D, which is separated from the offices, B B', by the passageway, C. The room, A, is used for the storage of finished goods; S is the picking room; Q is the drying room; the room, O, is used for wool washing, and the dye house is located at P. The room, G, is used for the storage of wool.

Figs. 5 and 7 show the arrangement of the rooms and machinery in the main mill. The rooms in the center, each 46 feet long and 25 feet wide, are used for storage of yarn. The cards, l, are on the ground floor. The shears and presses are in the room, L, the tentering and drying machines in Y'; the wet finishing in room M. The stairways and elevator are in the tower as shown.

Figs. 1 and 2 show the exterior of the mill. The course of the material in the process of manufacture can be traced by referring to the description of the plan given in the May issue.

According to a consular report the total value of ribbons exported from the St. Etienne district in 1906 was over $17,000,000, of which $1,137,000 were sent to the United States.



A PLAN OF A WOOLEN MILL

Questions and Answers

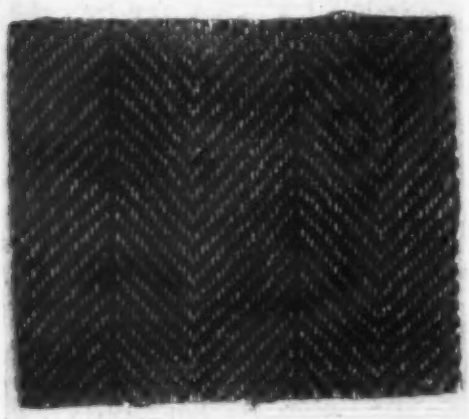
Under this head we undertake to answer, free of charge, to the best of our ability, any pertinent inquiry pertaining to textile matters received from any regular subscriber to the TEXTILE WORLD RECORD. Questions should be stated as briefly and concisely as possible. Inquiries pertaining to textile processes, machinery, improvements, methods of management, the markets, etc., are especially invited, as well as any legitimate discussion on the views expressed. All inquiries must be accompanied by the name of the person inquiring ,not for publication, but as an evidence of good faith.

For reply to questions that are not of general interest to readers of textile journals, such as those relating to the composition of yarns, analysis of fabrics, etc., we will charge the enquirer with the cost of the investigation.

Rowy Woolen Goods.

Editor Textile World Record:

We are sending you a 1-yard sample of goods we are trying to make, but it seems almost impossible not to have them rowy, even with two or three shuttles. The looms are narrow, with conditional take-up and strap head. We have taken every care with the mixing, oiling, weight of ends, working of spindles, adjustment of looms, etc.,



but still we get rowiness more or less, of all degrees and widths. Most of these places seem to start heavy and shade off. Would they weave better on positive take-up looms?

Duluth (915).

We should not call the sample received very rowy, in fact we consider it very free from rowiness. In view of the contrast between the warp and filling and the size of the yarn it reflects great credit on the mill. There is one bar in the centre of the piece which is rather plain, but it is difficult to find any difference in the remainder of the piece. We have analyzed two samples, one taken from the light bar and the other from the dark bar next to it with the following results:

Light sample: 11.94 ozs. per yd., 55 inches wide. Warp, 37.2 threads per inch, 2/19s cotton. Filling, 34.1 picks per inch, 2.38 runs.

Dark sample: 12.36 ozs. per yd., 55 inches wide. Warp, 37.2 threads per inch, 2/19s cotton. Filling, 36.7 picks per inch, 2.44 runs.

The weight of the dark sample is .42 ounces per yard heavier. The filling of the dark sample has 2.6 picks per inch more.

The filling of the dark sample is .06 runs lighter. The sizes given here are for the yarn as it is found in the cloth and take no account of the shrinkage in length and weight in weaving and finishing.

The difference in the size of the filling yarn is so slight as to be negligible. It follows that the difference in the shade is due to the difference in the number of picks per inch. This was evidently caused by some disarrangement of the loom such as a pick out or a slipping of the beam.

A positive take-up would unquestionably give better results than a conditional take-up. We would suggest that "Duluth" experiment with the positive take-up on one or two looms, and note results.

Dyeing Silk Velvets.

Editor Textile World Record:

Kindly give the reason why all-silk warp pile velvets are always dyed in the yarn, when cotton and silk plushes, in fact all plushes, are dyed in the piece.

Walpole (925).

Most of the all-silk velvets, whether reeled silk or schappe has been used in their construction, are made of skein dyed silk though some qualities, particularly the lighter ones, are frequently piece dyed. By dyeing the silk in the skein a better color is generally obtainable. The silk can be dyed faster to light, is is not so liable to crock, and a greater evenness of color throughout the piece is obtainable. While the expense of manufacture is greater it goes without saying that good qualities of velvets must not be defective in these particulars.

The dyeing of silk for velvets is very well done abroad, particularly in Germany. Many manufacturers here, making a good quality of black velvet, find it advantageous to have the silk for their warps dyed over there and import it, even at the heavy duty they have to pay. On plushes, cotton

mixed velvets, and the cheaper goods of this kind, the price is a dominating consideration and the piece dyeing, which is cheaper, answers very well for such fabrics. Velours.

In velvets where the warp and weft are of two different yarns, such as cotton and silk, the cloth, if piece dyed, will not come out even. Cotton and silk take the dye in different degrees of shade and the result would be anything but satisfactory. In plushes both warp and weft are the same and the dyed color would be certain to be evenly matched.

David Denier.

Cleaning the Licker-in.

Editor Textile World Record:

Should the licker-in and top feed roll of the card be thoroughly cleaned every time the cards are stripped, or should they be kept so the points are free, say for about 1/8 of an inch?

Doffer (927).

If "Doffer" will set the licker-in so that with his ear to the tumbler he can hear a faint tick, then set the top and bottom rolls close to the licker-in, and not clean them until they glaze over, they will keep clean for months. Anthony.

It is not necessary to clean the licker-in and top feed roll every time if the card is properly fitted up and set, and nothing is used in the emulsion to hold the dirt in the card and fill the wire. The wire should be of the right length on both feed roll and licker-in; if the wire is too long on the top feed roll, the stock will go too far into it and is liable to leave it in bunches.

There should be about 1/4 inch of clear wire on this roll. A short wire is also better on the licker-in. The points of the wire should clear by a good 1/8 of an inch. If properly set and fitted up there will seldom be any need of cleaning these rolls. I usually set with a 28 gauge. If everything is true, and the journals fit the boxes closely, they can be set a little closer. I always set as close as I can without danger of losing the point of the wire. A long wire here will not comb out and separate the fibres so well as a short wire. The more carding at this point, the better the work will be done, and the more foreign matter will be thrown from the card. This will be noticed more on the finisher card.

If the stock goes in this card in bunches, it will come out in bunches. The workers will not card them all out, although more evening-up can be done if the worker pulleys are of different sizes. To get the best results, the feed roll should have a stripper. This keeps the top roll clean and keeps the stock down so the licker-in will get a better hold of it. This stripper should be on both second breaker and finisher. If only one card has a stripper, it should be on the finisher. The licker-in should have a fancy. This I consider one of the most important parts of the feed end of a card, both for good work and economy of wire. Most carders use diamond point wire here. When the point of this wire is gone, it is useless for good work. A fancy properly set will always keep the points sharp and clean. With a fancy, the leader will last much longer and do its work better.

Neponset.

There is no need of stripping the licker-in and feed rolls every time a card is stripped and making a lot of unnecessary waste. A small fancy set 1/8 inch deep on leader-in will keep the points both sharp and clean. It is a good plan not to let either the top or bottom feed rolls get covered over too much with stock. There is no need of cleaning them every time the card is stripped. Do not let them run so long as to get the stock packed in a solid wad, which is often the cause of card clothing getting slack on the end. The carder can judge for himself when it is necessary to have them cleaned. Keep them so the stock on the point of wire will be soft and not wadded.

Sam Driver.

Shrinkage in Fulling.

Editor Textile World Record:

How do you determine the shrinkage in fulling in inches per yard? Strafford (889).

The average shrinkage of a woolen fabric in finishing should be determined as nearly as possible when the fabric is laid out. It is a detail of construction which in connection with the weight per yard from the loom and loss of total weight in finishing determines the weight of the finished cloth per yard. The shrinkage in length and width has much effect on the appearance of the finished fabric, and this is an additional reason why it should be decided upon before the goods are manufactured.

The question as to how much a woven cloth should be shrunk in length in finishing to weigh a given number of ounces per yard depends on the percentage of loss of the total weight in finishing and on the weight per yard from the loom. The loss of weight in finishing varies widely with the stock in the goods and the method of finishing. Worsted cloth made from yarn containing but little oil or other foreign substances may lose not more than 5 per cent. or even less, while the loss in the case of kerseys or beavers made from oily, dirty stock, sometimes reaches 25 per cent. or more.

The following example will illustrate the method

of calculation. The first piece of a particular fabric before finishing measured 45 yards and weighed 26 ounces per yard from the loom. When finished it measured 40 yards and weighed 23 4/10 ounces per yard. What is the percentage of total loss of weight in finishing, and how should the shrinkage of woven pieces be regulated that vary in weight per yard from the trial piece, in order to bring the finished pieces to weigh 23 4/10 ounces per yard?

The total weight of the woven piece was (45 × 26) 1170 ounces. The total weight of the finished piece was (40 × 23 4/10) 936 ounces. Hence the loss in finishing was (1170 — 936) 234 ounces, or 20 per cent. of the woven weight.

The proper shrinkage of pieces for different woven weights per yard is more easily calculated by assuming a woven length of 100 yards. For example: How much should a piece of the same fabric weighing 25 1/2 ounces per woven yard be shrunk to weigh 23 4/10 ounces per yard?

100 × 25 1/2 = 2550 ounces, weight of woven piece.

2550 — 510 (20 per cent. loss) = 2040 ounces, weight of finished piece.

2040 ÷ 23 4/10 = 87 2/10 yards finished.

100 — 87 2/10 = 12 8/10 per cent. shrinkage in length for woven goods weighing 25 1/2 ounces per yard woven to give a weight of 23 4/10 ounces per finished yard.

The equivalents of the different percentages in inches per yard are readily calculated. Taking the example just given, one yard equals (36 inches × 12 8/10) 4 6/10 inches per yard as the equivalent of 12 8/10 per cent.

These equivalents of the different percentages in inches per yard are needed by the fuller as the progress of the shrinkage in fulling is regulated at the fulling mill by placing two strings one or more yards apart on the selvage and noting the variations of this space from time to time during the fulling operations.

By the method already given the shrinkage for any woven weight per yard is calculated and a table constructed for the fuller. Taking the present example with a loss of total weight of 20 per cent. and a desired finished weight of 23 4/10 ounces per yard, the table would be as follows:

Ounces per woven yard.	Shrinkage in length Per cent.	Per yard.
27	7 7/10	2 3/4
26 8/10	8 4/10	3
26 6/10	9 1/10	3 1/4
26 4/10	9 7/10	3 1/2
26 2/10	10 4/10	3 3/4
26	11 1/10	4
25 8/10	11 8/10	4 1/4
25 6/10	12 5/10	4 1/2
25 4/10	13 2/10	4 3/4
25 2/10	13 9/10	5
25	14 6/10	5 1/4

A variation of 7 7/10 per cent. for 27 ounces to 14 6/10 per cent. for 25-ounce fiannels is too wide to give good results in finishing, consequently it is better when the woven weight per yard varies as much as this to vary the shrinkage less and get a more uniform felt on the goods, although this may result in greater variation in the finished weight per yard.

When the goods are flocked variations in the woven weights per yard can, within a limited range, be equalized in the finished cloth by varying the quantity of flocks applied to the goods.

Much better results are secured by keeping the variations in the woven weights per yard within narrow limits, thus avoiding any necessity for wide variations in the flocks or shrinkage in length. A clear understanding of the methods of calculation just given will enable one to compile a fulling table suitable for any grade of goods.

Off Shade Aniline Black.

Editor Textile World Record:

We are sending you a sample of our aniline salt dyeing, before and after chroming, which turned out all wrong. What is the probable cause? We think there was something wrong with the dye liquor as the lots since have been all right.

Reed (897).

It seems to me the goods were not run long enough in the aniline salt bath before chroming; this caused the shade to come out light and spotted. I am confirmed in this opinion by chroming the oxidized sample sent me, which gives the same results as are on the chromed sample.

Gilbert.

From the sample of the goods sent me I think "Reed" did not have enough aniline salt to balance the other ingredients. If the goods had been run longer in the tom-tom the green shade would have been more nearly the same on both sides of the goods. If the dye liquor was in proper proportion and from 12° to 14° Tw. and the goods clean, he should have had better results. Apparently the liquor was too weak, the goods not well boiled and not left long enough in the liquor.

In dyeing with aniline salt there are six important things for the man in charge to observe: Cleanliness of the goods; specific gravity of the liquor; proportion of salts to the oxidizing agents; time of the goods in the tom-tom; temperature of the oxidizing cages; chroming and washing.

If these details are carefully looked after and the chroming and washing done properly, a good rich color should be obtained, instead of the reddish brown which so often results from improper handling.

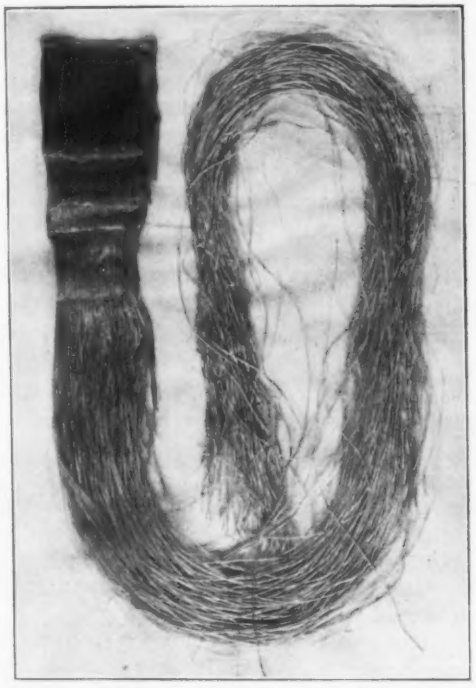
Henry Nevis.

A Morocco Fiber.

Tangier, Morocco, April 10, 1907.

Editor Textile World Record:

During a stay of four months in Morocco I have been looking into the extraction of the fiber of the American aloe, the principal vegetable growth of this country. I have been making some experiments in cleaning the fiber from the pulp and enclose a sample of the work done. By my method the fiber can be extracted full length, say up to



six feet, and is white and clean. The percentage of fiber in the leaf is shown by the sample. Many single leaves will weigh 50 pounds, while a good sized plant will run to 700 or 1,000 pounds. I think nearly 500 pounds of the fiber could be extracted in a day with a plant costing only a few hundred dollars. According to the terms of our treaty with Morocco, unmanufactured fiber cannot be exported so that it would be necessary to put it into some other shape in order to ship it, such as mattresses, matting, etc. There is a good field right here for the articles for which the fiber could be used. Nothing at all is being done with the plant except that the soldiers pull threads from it with which to mend their clothes. Enough of the plant necessary to run a factory for several years could be obtained at the actual cost of the donkeys to carry it, say, a shilling a day for each donkey. The extraction is simple and there would be no cost to it save the operation of the machinery. The pulp is strongly alkaline and some use might be made of it as well. I have not time to handle the proposition and if you know of anyone who would like to take it up I would be glad to make arrangements with him to that end.

George E. Holt (880).

We referred the letter and fiber to Chas. Richards Dodge, of Washington, D. C., who writes us as follows regarding it:

I see nothing in Mr. Holt's proposition but a small local industry. It would not pay to export the fiber anyway as there is practically no commercial demand for that kind of fiber. If there was a demand Mexico would be supplying it. Of course it is well known that the American aloe is the century plant, which flourishes in many parts of the world. The extreme elasticity of the fiber is against it for cordage and it is chiefly employed in native manufacture of articles and in domestic economy. Charles Richards Dodge.

Bleaching Cotton and Jute.

Editor Textile World Record:

I wish to thank you for the information given in the May number of your magazine on the cost of bleaching cotton in the piece. It gives me exactly the information I could not find elsewhere.

Referring to Wilkinson (820) in the March issue on bleaching jute, I would say that I have bleached some small quantities of waste and other grades of jute without any preliminary cleansing. The sample enclosed shows the color obtained.

Hudson Bay (813).

The sample can be seen at our Boston office.

Alum on Silk Goods.

Editor Textile World Record:

Will alum take the sheen from silk goods? Is it ever used to set the dye? San Jose (896).

Dyed silk passed through a bath of alum loses no lustre provided it is washed off afterwards. Certain coloring matters, such as the cotton blues and others of the same group, are dyed with alum, but the so-called "alum colors" have long since been replaced with dyes of far greater fastness.

Beta-Naphthol.

Weight of Warp.

Editor Textile World Record:

What is the weight of 2,610 ends of 14s cotton warp yarn, 4 1/2 yards long?

Mayville (908).

The weight of 4½ yards of 2,610 ends of 14s cotton warp yarn is calculated as follows:

14s cotton is equal to (14 × .5 1/4) = 7.35 runs.

2,610 (ends) ÷ 735 (yds. per oz.) = 3.6 ozs. per yard.

3.6 (ozs.) × 4 1/2 (yds.) = 16 ozs. for 4 1/2 yards.

KNITTING DEPARTMENT.

For Knitting Mill Machinery, Equipment and Supplies, see pages 236 to 253. Also Buyers' Index.

THE KNIT GOODS SITUATION.

The last month has been devoid of any very interesting events in the knit underwear market. Business on light weights at first hands has ceased by reason of the production being sold up and it is yet too early for any attempt at heavy weight business.

Some reports of offerings for fall, 1908, have been heard, but when traced to headquarters, have been found to be fairy tales, except in one instance where it was found that a line of ladies' 7-pound combed goods had been offered for February and March delivery at $3.62 1/2 net by a manufacturer who expects to carry over a small stock of yarn.

It seems to be the general impression of most interested parties that it would be a difficult matter this season to get any agreements on prices or dates of opening of the lines of men's fleeces and ladies' ribbed goods, as was done for 1907. Certain it is that some of the largest manufacturers who took part in the gentlemen's agreement last season, have volunteered the information that they will not tie themselves up again in this manner and this being true, we may look for an early opening of these lines and a long drawn out selling season, which, as a rule, works disadvantageously for the manufacturer. Now manufacturers today have the situation well in hand and such action as above noted is to be regretted; it is hoped that there will yet be enough good judgment used to get at least a fairly good representation of manufacturers of these lines together to set a late date for opening. If this can be done, the chances of obtaining fair prices for merchandise will be improved.

Some manufacturers have been making inquiry among their customers as to the advisability of continuing the old standards at advanced prices, or making new lines at so-called popular prices, and in nearly every case, buyers are advising the making of goods at popular prices and to back up their judgment, are mentioning the manner in which the retail trade are today placing orders for men's balbriggans, weighing 3 3/4 pounds with two button single seated drawer at $2.25, rather than pay the extra shilling for 4 1/4-pound goods with double seated drawer. It looks as if 25 and 50 cents were bound to be popular prices, so long as Uncle Sam continues to issue coins of these denominations and so long as there can be any kind of garments produced to sell at these prices, regardless of the fact that much better goods can be made proportionately to sell at 29c. and 59c. or some other odd price.

It is said that ladies' 6-pound ribbed goods are in the last ditch and that to make any further deterioration, would be to make the goods unsalable. Nevertheless, one can remember when 5 1/2-pound ribbed goods with agate buttons were made to sell at 25 cents. If the raw material conditions warrant it, we think it will probably be done again, although of course there would not be as many used as when 7- and 8-pound goods were sold for 25c.

There is a tendency among consumers to wear lighter weight underwear and we dare say that 10 1/2-pound ribbed or fleeced goods for men and 6- or 6 1/2-pound combed goods for women to retail at 50c. may be made quite as popular as the heavier weights have been during the last few seasons.

Retailers who have been visited by jobbers during the last month have placed spring orders rather sparingly as a rule. A great many buyers say they are carrying over large stocks of light weight goods, as a result of the cool spring. In some instances the financial heads have worked against placing orders freely by calling the buyer's attention to presidential year, tight money market, etc., so that salesmen are not so enthusiastic about the future as the general prosperity of the country would seem to bespeak.

Judging from the business so far done with retailers, there will be no particular changes in the character of summer underwear desired. Some new things are in the market, one of which is a patent pant for ladies shown by the Vesta Knitting Co. of Providence, R. I. This is made by cutting the garment in one piece, eliminating the circular yoke and bringing the bias of the cloth over the hips. It is claimed that it covers more perfectly than any pant that has been put on the market and that owing to its construction, it does away with the bulging fullness at the waist, hips and seat, the main defect of other pants. These are made in a range of fabrics to retail at 50c. to $1.50.

Another new garment in the market this season is a combination suit for men, the upper part of which is made of a fine lisle mesh fabric with the drawer part of choice nainsook. This is made either with short sleeves or sleeveless, in knee length, and gets to the retailer for a $2.00 garment.

HOSIERY.

The supply of fall hosiery available for duplicate orders is the smallest on record, although it cannot be said that there is any very active canvass by buyers. It looks as if the early orders had been made of sufficient size for a good share of the season's needs. Although some few cancellations have come from certain quarters, this causes no uneasiness on the part of the manufacturers, as there seems to be enough demand to take the place of all the cancelled orders.

A number of manufacturers who have heretofore made both heavy and light weights, have taken no orders on heavy weights this fall, as they have had orders enough to keep the machinery going on light weights throughout the year. This has had the effect of shortening the production of both the ribbed top and hemmed top fleeced goods, as well as the heavier weights in half hose almost one-third. This has resulted in somewhat of a demand for wool and worsted goods, and in consequence they have been in a well sold up condition.

Considerable new hosiery machinery has been installed of late, but in most instances it has had no effect for the reason that it has been impossible to get help to run it. Now that the vacation months are over and the help are returning to the mills this will not be such a serious problem, and it is hoped that it will be possible to get sufficient labor now to clean up some of the accumulations that have been piled up in the finishing rooms of a number of the larger mills.

The situation on all spring lines remains practically unchanged since the last writing. If any change is to be noted, it is that the low end goods are more scarce than ever and a manufacturer who has any 144-needle goods to sell, has only to make it known.

All lines of embroidered and split foot goods are sold up high and dry and as for good values in fine gauge or full fashioned goods, they have been sold up for so long that they are scarcely mentioned now. Low priced gauze goods, as well as laces, are just now suffering a depression. Consumers have apparently learned their lesson on low priced gauze goods, because of their poor wearing qualities. The trade are also looking for a change from laces.

Orders for spring show that blacks have the best of it, and that tans and whites will both be in good demand. Of course, some new shade may suddenly become popular and a good business be done on it, but it is yet too early to say anything definite as to what it will be.

FANCY KNIT GOODS.

With the coming of fall, knit blouses and coats for ladies seem to be growing in popularity. The buyers in the market recently have bought quite freely, and although they say they are carrying over some stock there appears to be a feeling that the business will be of large volume. It is noticeable that the consumers are buying better goods and that the only slow spot in the blouse business is on the cheap numbers.

Eton jackets are not proving so successful as was expected, the criticism being that they look too much like the knitted vests of three or four years ago, but the pony coats and regular single and double breasted blouses are in favor. One of the newest blouses is a fancy stitch single breasted garment trimmed with several rows of braid,

running around the bust, and a pony coat that is selling well, is one made double breasted with wide silk braid round the neck and down the front. It has pockets below the waist line and makes a rather mannish looking garment.

Motor scarfs are growing in popularity and are shown in a wide range of patterns in wool and ramie fibre. Recently some very handsome silk scarfs made in France of a very light weight gauzy texture are being shown by the more exclusive houses.

THE MANUFACTURE OF BRAID IN THE UNITED STATES.

BY FERDINAND THUN.

(Continued from September.)

BRAIDER BENCH ELECTRICALLY DRIVEN.

In the preceding articles a description of all the principal types of plain braiding machines has been given, and before going into the more elaborate machines for producing lace braids and "Radium" patterns, I will describe the latest improvement in the method of driving braiding machines. Fig. 71 shows a braider bench designed by the Textile Machine Works, which has an electric motor built into it and direct-connected to the frame. This motor is fastened under a solid cast iron bed plate in such a manner that it takes away practically no space which would be otherwise useful. Usually a 2 h. p. motor is employed, running at a speed of 1,080 revolutions per minute. The shaft of this motor is provided with a pinion which meshes directly into a large driving gear fastened on the main shaft. This large driving gear is 26.6 inches in diameter and has 266 teeth. The motor shaft pinions are furnished with 19, 20, 21 or 22 teeth respectively, which allows of a variation in the speed of the main shaft from 85 to 110 r. p. m.

The driving sets used in connection with these benches have driving gears of 50 teeth. The bevel gears on these driving sets are provided with 36 teeth for the gear on the vertical shaft and 18 teeth for the gear on the main shaft. The speed of the 50-tooth

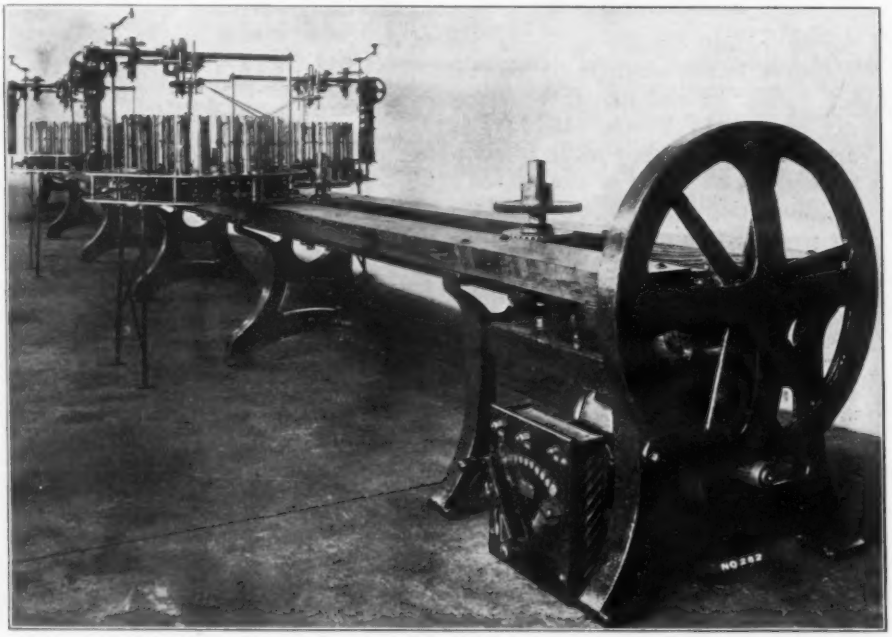


FIG. 71.

driving gear is, consequently, one-half that of the main shaft. To the left of the motor is shown a starting box, such as is usually employed. This device can be fastened to

any convenient point on the driving bench and is preferably fastened on a column or against the wall. It is used only in the morning and after dinner when the plant starts work.

The great convenience of the electric drive over the old style belt drive is very obvious. In all the larger cities electric current is available, and it is only necessary to connect the wires to the motor. There are no belts and pulleys to carry dust and dirt, and as a result the rooms remain clean and are more sanitary. The expense of operating braiders electrically is, under ordinary conditions, not more than where the power is transmitted by belts. The friction losses of belt transmission may safely be figured as averaging 30 per cent., and this power is all saved. One 2 h. p. motor will operate a bench forty or forty-five feet long, and will easily take care of 2,000 to 2,400 braider carriers.

The initial expense of the installation is also in favor of the electric drive whenever a new plant is started, as the total cost of power transmission machinery is saved, as well as the expense of an engine or motor to supply the power.

JACQUARD MECHANISM FOR BRAIDING MACHINES.

In some of the preceding articles of this series, I have referred to jacquard machines, which were of simple construction, and in connection with which the jacquard mechanism was used as a modification only of other switch operating means, see Figs. 11 and 64. On the more elaborate types of braiding machines, such as lace braiders and bicircle machines, the jacquard apparatus is essential, and one of the most important parts. Fig. 72 is an isometric drawing of the jacquard motion as designed for braiding machines by the Textile Machine Works.

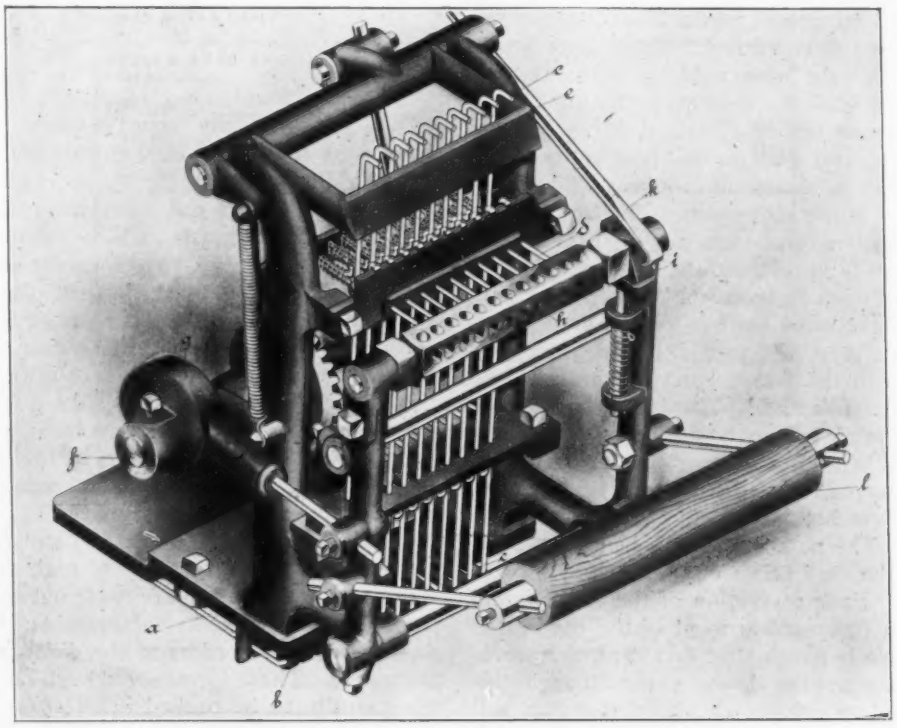


FIG. 72.

The formation of patterns on a jacquard braiding machine is effected by the movement of switches, which guide the carriers

around the track as required. These switches are fastened on shafts extending through the top and bottom plates of the machine. Below the bottom plates rigid arms are fixed on the shafts by means of which the required movements are transmitted to the switch. Wires are fastened to the arms and also to the jacquard apparatus. One of these wires is shown at a, Fig. 72. At b is shown the point where this wire enters a bell crank lever which converts the vertical movement of the lifter hook, c, into a horizontal movement. These lifter hooks, c, co-operate with needles, d, so that by pressing back the needles, d, the lifter hooks are pushed out of a vertical into a reclined position, and while in this position the lifter or knife, e, clears the hooks and does not exert a lifting movement. The lifter, e, has a constant up and down movement, while the machine is in operation. This movement is derived from an eccentric fastened to a shaft, f. On the same shaft is located another eccentric, g, which provides a reciprocating motion to the frame, carrying the card cylinder or prism, h. The latter is provided with a ratchet, i, upon which a hook, k, slides loosely in such a manner that at every forward movement of the prism, h, and ratchet, i, this ratchet is turned a distance of one tooth. The number of teeth being four, this turns the card prism one-quarter of a revolution. Each revolution of the shaft, f, will bring a new card in front of the needles, d. If a hole is punched in this card, the corresponding needle, d, will enter through this hole and its co-operating lifting hook, c, will remain in the perpendicular position in which it is acted on by the lifter, f, and, therefore, a forward movement is imparted to the wires, a, corresponding with the lifting hook and needle opposite which the hole is punched in the card. As the number of cards can be greatly varied, it is clear that an almost endless number of patterns can be obtained with the jacquard motion. The roller, l, shown in front, can be adjustably arranged to serve as the other bearing for the chain of cards.

These jacquard motions are made with a greater or smaller number of co-operating parts, consisting of crank levers, lifters, needles and holes in the prism, to suit the size of the machine. Sometimes two and even more jacquard devices are put on one braider, depending on the size and type of the machine. The bevel gear shown on the shaft, f, transmits the motion from the braider by means of another mitre gear arranged on a vertical shaft connected with one of the spur gears in the machine.

(To be continued.)

AN ORDER AND COST SYSTEM FOR A KNITTING MILL.

BY ESEK EASTON.

(Continued from August.)

Fig. 7 is for a daily record of cloth cut. It shows the number of dozens cut, shrinkage of cloth, the weight of the goods as cut, and the waste from each roll. Necessary waste is defined as the waste which cannot be avoided, such as the V pieces made by cutting the drawers, and the waste in cutting the sleeves. The unnecessary waste is that caused by defective knitting, which would have gone into goods instead of into waste if the knitting had been perfect. As the waste item in a mill is very important, a careful study of these two columns by the superintendent and boss knitter aid in keeping this item down to a minimum.

The forms shown at Figs. 8, 9 and 10 are for a record of the quantity of each size of shirts and drawers, and are made out in triplicate from the office by using carbon paper, as they represent orders to the different departments. These forms should call only for the quantity to be packed in one case with the assortment of sizes as wanted. Fig. 8 goes to the cutting room; Fig. 9 to the finishing room; Fig. 10 to the shipping room. Fig. 9 is the order for the foreman of the cutting room. As several rolls of cloth will be required to fill a single case order, the foreman numbers each order on a ticket, and then issues to each cutter a separate written order bearing the ticket number and the number of dozens to be cut of a certain size out of certain sized rolls of cloth. As fast as these goods are cut they are placed together according to their respective ticket numbers, and when the whole of the order, as called for on the form at Fig. 8 is cut, the goods are

placed in a truck or basket, the form, Fig. 8, attached to it, and sent to the finishing room. When received there the goods are first checked off to make sure the quantities are correct, then the form at Fig. 9 is attached to Fig. 8 and the goods are ready to be finished. Each order as it goes through the several processes should be returned to the truck or basket and passed along the room until all operations are completed, then sent to the shipping room to be boxed and packed. The shipper uses the form shown at Fig. 10.

CUTTING ROOM

Order No.	Ticket No.	Style No.	Machine No.	Lbs Knit	Lbs Dried	Shrinkage lbs.	Size of Cyl.	Size Cut	Shts Doz.	Dbs Doz.	Sleeves Doz.	Necsry waste- lbs.	Unnecsry waste- lbs.	Total waste- lbs.	Net wt per doz. lbs.	Net wt per doz. ozs.	Remarks
																	Cut from unnecessary waste
																	Gussets & Seats ____ lbs Double Breasts ____ lbs Total ____
																	____ Foreman

FIG. 7.

Ticket No. ____ Date ____ 190_.
Order No. ____
Style No. ____ CUTTING ROOM
Cutters No. ____

Shirts											Total Doz.
	30	32	34	36	38	40	42	44	46	48	
Drawers											Doz.

Remarks—

Sleeves ____ Doz.

Checked by ____ ____ Foreman

FIG. 8.

Order No. ____ Date ____ 190_.
Style No. ____ FINISHING ROOM

Shirts											Total Doz.
	30	32	34	36	38	40	42	44	46	48	
Drawers											Doz.

Style of finish ____

Date finished ____ 190_.

FIG. 9.

When the goods are shipped, Figs. 8, 9 and 10 are returned to the office together.

Any shortage in the order from the cutting room should be made up before the goods are started in the finishing process. Any shortage after finishing should be made up by a replace order, giving reasons why the order is short. The replace orders sent to the cutting room indicate the number of seconds made. All goods received in the finishing room, Fig. 8, should when checked be examined for seconds before finishing. They should again be examined for seconds before being sent to the shipping room, so as not to delay shipments, which would be the

Order No. ____ Date ____ 190_.
Style No. ____
Case No. ____ SHIPPING ROOM
Color of Boxes ____

Shirts											Total Doz.
	30	32	34	36	38	40	42	44	46	48	
Drawers											Doz.

When to ship ____
How to ship ____
Date shipped ____ 190_. Packed and shipped by ____

FIG. 10.

GOODS FINISHED

Date ____ 190_.

Name	Doz.
Shirt Finishers	
Drawer Finishers	

Forelady

FIG. 11.

DRY ROOM

Date ____ 190_.

Size	Style	Lbs	Size	Style	Lbs.
20	8	53			
18	14	51			

FIG. 12.

case if seconds were discovered when being folded.

Fig. 11 is for a daily record of goods finished and shows the production of the finishing room in dozens. The name of each shirt or drawer finisher is put down. Fig. 12 is for a record of production in the dry room, showing the number of pounds of cloth dried each day. This is tabulated in the column at Fig. 13. From this weight and the amount paid to employes in the wash and dry room, shown at Fig. 14, the cost per pound for washing and drying is calculated.

Fig. 15 is for a record of stock received and used. It can be kept in the form of a book. It enables every bale of raw material to be traced, showing whether it has been used or not. From this book the amount of stock on hand can be verified. The cost per pound for handling the stock is also found from Fig. 15. The size of the form should be adapted to the business of the mill.

Fig. 14 is a pay roll form. This record should be subdivided with the names in each

Month of _____ 190 .

Day	Picking & Carding Total lbs.	Yarn Spun Total lbs.	Cloth Knit Total lbs.	Cloth washed dyed, dried Total lbs.	Goods cut Total doz. Shirts	Goods cut Total doz. Drs	Goods finished Total doz. Shirts	Goods finished Total doz. Drs.	Goods shipped Total doz.	Remarks
Totals										
Payroll for mo.										
Cost per lb or doz										

FIG. 13.

Payroll

Week ending _____ 190 .

Name	S	M	T	W	T	F	S	Total Hours	Rate per hr.	Amount		Total	
Stock Room													
John Robinson		10½	10½	10½	10½	10½	7½	60	20	12	00		
Fred Brown		10½	10½	-	10½	10½	7½	49½	20	9	90	21	90

FIG. 14

STOCK

Month of _____ 190

Date Rec'd	Wool Received Bale No.	Wool Received Gross Wt. lbs	Wool Used Ticket No	Wool Used Net Wt lbs	Cotton Received Bale No.	Cotton Received Gross Wt. lbs	Cotton Used Ticket No.	Cotton Used Net Wt. lbs.	Shoddy Received Bale No.	Shoddy Received Gross Wt lbs	Shoddy Used Ticket No	Shoddy Used Net Wt lbs	Noils Received Bale No.	Noils Received Gross Wt lbs	Noils Used Ticket No.	Noils Used Net Wt lbs.	Other Stock Received Bale No.	Other Stock Received Gross Wt lbs	Other Stock Used Ticket No	Other Stock Used Net Wt lbs.
			40	300			40	50			40	50								
			42	100			42	100			42	150								
			43	100			43	100			43	150								
	1044	560	47	65	A360	480	47	715	402	503	47	138								
Totals																				

Cost for month $ _____

Cost per lb. _____

FIG. 15.

department as shown so as to keep the labor cost separate. Fig. 16 is for a summary of the business and should be kept in a book. are tabulated there and the average cost per pound or dozen entered in the respective column.

Month of_____ 190

						2		3		4		5	
Date	Name	Particulars	B.F.	L.F.	C.B.	Ledger Accounts		Bank		Int. & Disc.		Cash	
						Dr	Cr	Dr	Cr	Dr	Cr	Dr	Cr
	John Robertson	5 Bales Wool					340 25						
	Thos Smith & Co	Shirts & drawers	1			480 75							
		Cash							20 -			20 -	
	Frederick Jones	Payroll											20 -
	N Y C & R R	Freight on wool							8 90				
	Thos Smith & Co	Check					471 15	471 15					
	" " "	Discount 2%					9 60			9 60			
	John Robertson	Check				333 45			333 45				
	" "	Discount 2%				6 80					6 80		
	Tompkins River & Co	1 Machine					750 50						

FIG. 16.

NEWTON KNITTING MILLS

Month of_____ 190

	6		7	8	9	10	11	12	13	14	15	16
	Sales		Mdse	Wages	Expense	Freight	Duty	Machinery	Needles	Repairs	Com'n.	
	Dr	Cr	Dr	Dr	Dr	Dr	Dr	Dr	Dr	Dr	Dr	
			340 25									
		480 75										
				20 -								
						8 90						
								750 50				

FIG. 17

NEWTON KNITTING MILLS

MANUFACTURERS OF

Mens High Grade Underwear

Binder Folio 1

Sold to- Thomas Smith & Co

New York, June 1, 1907.

Terms 4% 10th/uly or 2% 10 days

Case No.	Style No.	Special No.	Dozens Sixth	Dozens Drs	Kind	Size	Price	Item	Total
2	8	E 2	6		Mens Wool	36	8.00	48 -	
			10			38	"	80 -	
			8			40	"	64 -	
			6			42	8.12½	49 75	
3	8	E 2		6		34	8.00	48 -	
				10		36		80 -	
				8		38		64 -	
				6		40		48 -	
									480 75

FIG. 18.

A record of one month can be put on one page, or the book made smaller for a shorter period. The totals from the pay roll form Fig. 14, for each of the several departments

Fig. 18 is an invoice form, which can be made in duplicate or triplicate as required by the use of carbon paper. If made out in triplicate one copy is sent to the customer,

another to the commission agent and the third kept on a loose leaf file, making a complete sales book in detail. If used in this way no separate sales or day book is required. The amounts of the invoices can be posted direct to ledger accounts on Fig. 16. This avoids all mistakes, which are usually made when an invoice is copied or charged in a day book, besides saving the extra labor of copying, the triplicate invoice being made at one writing. They should be numbered in notation in corner under binder folio. This number is entered in the column BF, Fig. 16. This binder folio number is entered in the general ledger so that the entries in the ledger will refer back direct to the details of the invoice. Figs. 16 and 17 are for a system of double entry bookkeeping in a knitting mill and can be used with the other forms to ascertain the average fixed charges and expenses outside the labor cost. This system combines the cash, day book and journal in one book and practically does away with the two last named books and saves considerable labor. It is necessary to have a corresponding credit entry for every debit entry, and a debit entry for every corresponding credit entry. It is easy to classify the different accounts under different headings as desired. As shown at Fig. 17, column 16 has a blank heading. Several of these can be left in the book for any new headings that may be required. Both sides of the book are required for Figs. 16 and 17 as shown. The debits and credits of each account are side by side, and the abbreviated terms, Dr. and Cr., are not written with every entry as in the old method of day book and journal.

As shown at Fig. 16 the mill has bought of John Robertson five bales of wool, the invoice amounting to $340.25. John Robertson is credited with the amount in column 2. All materials which enter into the manufacture of underwear are generally classed under one heading, as merchandise, column 7. We debit merchandise account with it, but here again raw material or stock may have a separate heading if so desired.

The second entry to Thomas Smith & Co. is for goods shipped to them. This item is taken from Fig. 18, the customer being debited and the sales credited. The mill keeps a bank account, but will require cash in the office for small payments or for payments on account of wages. The third entry is cash drawn from the bank, the bank credited and cash debited. The fourth entry is for wages paid to Frederick Jones. Cash is credited and wages debited.

When the pay roll is made up and the total amount ascertained, the correct amount can be drawn from the bank, the bank credited and the wages debited. The fifth entry is for a check to New York Central Railway Co. for freight on wool. The bank is credited and freight is debited.

This system saves the posting of many single items in one account in the ledger. The totals at the end of the month for each of the separate accounts are posted in the ledger in one amount.

PRICE OF KNIT UNDERWEAR.

Editor Textile World Record:

We wish that you would solve the problem for us. Four-pound ribbed goods that sold last year at $1.90 are being offered today at from $2.10 to $2.12 1/2, an advance of 20c a dozen or 5c a pound. Now we are informed by the commission agents that all the New York mills are selling eleven-pound ribbed goods for Spring delivery at $3.75, same as sold last year at $3.50. This being an advance of only about 2c a pound. Why is the advance less on the eleven-pound goods than on the four-pound goods? This is a matter in which we are deeply interested, and we hope that you can find out for us what we ask.

Yours truly,

Vinton (916.)

We find that upon looking up this matter that at least one line of 11-pound goods was sold in the month of March for July delivery as low as $3.25, and on this basis it might be possible to buy a similar line for next season at $3.75, which would be an advance about the same as on the light weight goods; however, this manufacturer has not as yet quoted any prices for 1908, and states that he will not do so under four to six weeks, and we have made careful inquiry among all the other New York representatives of State

mills and failed to find any of them quoting prices for next season. We might also add that the above mentioned line is made of a low grade waste yarn and is not as expensively trimmed as the regular standard goods weighing twelve pounds that have been sold this season at $3.75.

Fillmore.

KNITTING MILL NEWS.

New Mills.

*Georgia, Augusta. The J. J. Tyler Hosiery Mill advise that their mill is under construction and they expect operators will commence during October. Twelve latch needle cylinder knitting machines will be installed at the start, and this number will be doubled by January 1st. 16s to 18s yarn will be bought.

*Georgia, North Augusta. It is expected that the entire plant of the North Augusta Knitting Mills will be in operation October 1st.

Maryland, Baltimore. The Baltimore Knitting Mills, recently started up at Holliday and Saratoga Streets, by Charles N. Parrish, is being equipped with 25 knitting machines, which are to be run on high grade seamless hosiery. The machines are now being delivered. The product will be sold direct.

*New Jersey, Camden. The Merrimac Manufacturing Company, reported by us as being located at 95 and 97 Federal Street, are now installing their machinery. This company, which has a capital of $125,000, will manufacture a line of Swiss ribber underwear of cotton, lisle, worsted and silk, which they claim will compare favorably with any foreign goods on the market. At this time they have in operation 10 knitters but cannot say how many machines their plant will contain, as they are of a new pattern, and built under their own designs and patents. They also state that the quarters in which they are now located are only temporary, it being their intention to put up a mill of their own. The production, which will consist of 1200 dozen per week to start, is sold direct. The officers are E. G. Locks, pres.; W. Leonard Hurley, vice pres.; George A. Frey, sec. and treas.; Harry Walker, manager; and George E. Nye, superintendent. The two last will do the buying. They are using 20/6 and 20/8 C. E. lisle finished, and 2/50 and 2/55 mercerized yarns.

New York, Brooklyn. M. D. Arnold (363 Hancock St.) is contemplating starting a small plant a short distance up the Hudson River to manufacture sweaters, cardigans, ladies' blouses, etc.

*New York, Port Leyden. The Port Leyden Knitting Co. has been incorporated with capital stock of $5,000 and it is expected that operations will start in leased quarters within a few weeks. John C. Fogarty, DeWitt C. Markham, Fred D. Markham and others are the incorporators.

*New York, Sidney. Julius Kayser & Co. of Brooklyn, who operate mills in a number of places, have bought the plant of the Clark Textile Co., manufacturers of ladies' silk gloves. It is reported that another mill will be built and the Amsterdam plant of Julius Kayser & Co. transferred to this place.

North Carolina, Burlington. A new knitting mill to be known as the Selles Knitting Mills will soon be started here. D. E. Sellers is manager of the plant, which will be equipped with 40 machines for making fine gauge half hose in the grey.

North Carolina, Flat Rock. The Skyland Hosiery Company has been incorporated with a capital stock of $30,000. J. F. Wilcox, F. S. Wilcox and L. B. Stillwell are the incorporators. Hosiery and other knit goods will be manufactured.

*North Carolina, Parkton. Mr. J. C. Shamberger reports that the plant he is starting will be named the Maryland Hosiery Mills, and production begin about September 16. Men's full seamless hose, 144 needles, will be manufactured. 10s to 36s yarn will be bought.

*Ohio, Cleveland. The Raven Knitting Co., recently reported incorporated, advises that machinery is arriving and being installed every day. It is expected that the full equipment will be running in a short time.

Ohio, Gibsonburg. Jos. Roth & Company of Toledo, Ohio have leased space in the Hanline building and are installing 50 knitting machines for the manufacture of gloves. Production of goods will begin about September 1st.

*Pennsylvania, Philadelphia. The Milander-Newman Company, with temporary offices at 129 West 46th Street, New York City, have leased the fourth floor of the building at the N. E. cor. of Mascher and Oxford Streets. Machinery for the manufacture of hosiery will be installed. The company takes possession September 15.

*Pennsylvania, Pottstown. Andrew E. Vaughan is president and superintendent of the Vaughan Knitting Co., capitalized at $10,000. This plant will make men's and women's goods with 120 knitting and 5 sewing machines. Will use steam and electricity.

Rhode Island, Providence. A stocking factory has been started in the building at the corner of Gurney Street and Waterman Avenue.

*South Carolina, Oakwood. The knitting mill being started by C. E. Hallman will not commence manufacturing until the early part of 1908. A number of hosiery machines will be installed for the manufacture of men's half hose. Water power will be used.

*South Carolina, Seneca. We have been advised that manufacturing will begin in about 60 days in the new knitting mill reported as being started at this place. The name of the company has not yet been decided upon, but T. M. Street will be secretary, treasurer and buyer. The charter has been applied for with a capital stock of $25,000. Hosiery and underwear will be manufactured. Machinery equipment has not been contracted for.

Washington, Olympia. The Pacific Knitting Mills have been incorporated with a capital stock of $20,000. J. H. Morehead, A. L. Johnson and others are the incorporators.

*Wisconsin, Luxemburg. The Inland Woolen Mill has been organized by Peter Boucher for the manufacture of woolen knit goods. Operations will

commence January 1. Construction work on the plant was started September 14. A steam power plant will be installed.

Enlargements and Improvements.

Canada, Ontario, Hamilton. The Ellis Mfg. Co. is considering plans for a new knitting mill.

*Georgia, Barnesville. Work has been completed on the new bleachery for the Oxford Knitting Mills. They have also put in new knitting frames and finishing machines.

*Georgia, Columbus. We have been advised by the Topsey Hosiery Mills that they are not building any addition to the mill, but simply adding new machinery.

*Illinois, Rockford. The 5-story building of reenforced concrete, 140 by 115 feet, which is under construction for the Burson Knitting Co., is nearly completed. It will be used entirely for knitting and will allow for the doubling of the present capacity of the plant. The first installation of machinery will be 100 knitting machines. Dyeing and finishing will be done in the old building.

*Minnesota, Minneapolis. Contract has been let by the Northland Knitting Co. for a building 200 by 50 feet, two stories high. Construction work will commence immediately as it is planned to start manufacturing by November 1st. This is the company which was recently reported as being a reorganization of the Appleton Knitting Co., of Appleton, Wis., and the Twine Gity Knitting Co., of Minneapolis.

*New York, Averill Park. The new mill of the Faith Knitting Co., on which construction work was started after the burning of the old plant, is nearly ready for occupancy.

*Pennsylvania, Philadelphia. The new mill for the Brown-Moore Co., which is being erected at Westmoreland and Palethorp Sts., is almost ready for occupancy. The company expects to have it equipped with machinery and ready for operation by January 1.

*Pennsylvania, Robesonia. The new building erected for H. W. Sheeler has been completed and machinery equipment is being installed.

Pennsylvania, Slatington. The Crystal Knitting Mills are installing additional knitting machinery.

Pennsylvania, Woolrich. John Rich & Bros. are reported to erect new buildings and add new equipment for manufacturing socks and mittens.

*Pennsylvania, Wernersville. Hain Bros., who purchased the Wernersville Hosiery Mill are installing 14 new knitting machines and making various improvements in the plant.

*Rhode Island, Providence. The factory being started at the corner of Gurney street and Waterman Avenue, previously reported, is a branch of the Blackstone Stocking Company of Central Falls, R. I.

South Carolina, Walhalla. The capital stock of the Oconee Knitting Mill has been increased to $30,000. The dye house has been changed over to dye sulphur black, and 10 new knitting machines have been ordered. Other improvements will be made in the finishing department.

South Carolina, Westminster. The Westminster Knitting Mills have added $20,000 to the capital stock of the corporation and will make extensive improvements.

Tennessee, Chattanooga. The Mathis-Davis Hosiery Mills at East Chattanooga will make extensive improvements. A finishing and dyeing department is to be added and the machinery equipment repaired and new machinery installed. Improvements will cost in the neighborhood of $50,000 and it is expected will be completed about the middle of October.

Tennessee, Clinton. The Magnet Knitting Mills have installed 5 new knitting machines, and will shortly install 20 more. This step is necessary owing to their rapidly growing business. Additional improvements have been made to their water works, giving them 30,000 gallons of filtered water per day.

*Tennessee, Johnson City. The Watauga Hosiery Co., which recently purchased the Unaka Knitting Mills, have moved their equipment to the latter building, which is much larger. They are installing a dye plant and a number of new machines, and will have capacity of 2,000 pairs misses' and 1,200 pairs men's goods daily.

Personals.

Ren Hotaling has accepted a position as overseer of finishing for the Gilbert Knitting Co., Little Falls, N. Y. He was formerly employed at Mohawk.

W. Frank Van Kuren, overseer of spinning for the Clayville Knitting Company, Clayville, New York, has resigned.

A. G. Riviere has accepted the position as overseer of finishing for the Newville Knitting Company, Newville, Pa. He was formerly employed at the Hanson Crowley Company, Barnesville, Ga.

Percy A. Simons has accepted the position as overseer of knitting for the Waiontha Knitting Company, of Richfield Springs, N. Y. He was formerly employed at the Elk Knitting Mills, Philadelphia, Pa.

Chas. N. Parish of the Consolidated Cotton Duck Mills, Woodbury, Md., has opened a knitting mill at Baltimore, Md.

W. S. Lowe, overseer of knitting for Cook, Emert & Co., Somerset, Pa., has resigned and returned to his home in Laconia, N. H.

Daniel E. Coffee, overseer of spinning at C. B. Alling's Mill, at Derby, Conn., has severed his connection with that company.

Burton S. Ashby has accepted the position as overseer of spinning for C. B. Alling at Derby, Conn. He was formerly employed at the Somersville Mfg. Company, Somersville, Conn.

A. Jerome Baurer has been appointed superintendent of the Columbia Knitting Mills, Kinderhook, N. Y.

John G. Shark has accepted the position as overseer of knitting for Cohen & Marke Knitting Mills, of Philadelphia, Pa.

Burton B. La Fleur has accepted a position as overseer of knitting for the Peerless Underwear Company, Mattapan, Mass. He was formerly employed with the Universal Winding Company, Boston, Mass.

New Machinery and Processes.

This department is designed to present from month to month a brief mention of new machinery, devices and processes being brought out in this country and abroad, that are of interest to textile manufacturers. It is not a list of patents, but of improvements coming on the market. The idea being to present to our readers a systematic monthly record of new machinery etc., of interest to textile mill men.
We invite machine builders and others to send us such information for this department.

Dobby Motion. The Positive Dobby Motion, 1058 So. Water St., New Bedford, Mass., is bringing out an improved dobby motion, which can be seen in operation at the textile school in that city.

Narrow Fabric Loom. Kilburn, Lincoln & Co., Fall River, Mass., are bringing out a new narrow fabric loom, which contains many improvements suggested by experience and recent developments in this branch of weaving.

New Finishing Compound. The Arabol Mfg. Co., 100 William St., New York, N. Y., are bringing out a new product which they call "Tangol." It is a vegetable glue in granular form which readily dissolves in hot or cold water. It is intended to be used in sizing, finishing, weighting, dyeing, waterproofing and fireproofing, and as a dressing for yarns. The company have published some special literature descriptive of this product, which may be had on application.

Double Cylinder Jacquard. I. T. Hardacre, City Jacquard Works, Bradford, England. An improved double cylinder jacquard motion adapted for changing looms from single to double cylinder.

Combination Brush for Carding Flats. Philipson & Co., Bolton, England. A combination brush for cleaning the wire of revolving flat cards.

Knitting Machine for Boucle Effects. C. Terrot Sons, Cannstatt, Germany. A knitting machine designed for producing loop or boucle effects on the face of the fabric.

Ring Spindle Drive. Jean Jacques Rieger, Lure, France. A method of driving ring spindles, which, it is claimed, results in greater uniformity of twist.

Cotton Loom. E. Lacharriere & Co., Nottingham, England. A cotton loom which is recommended by the builders not because of any radical departure in its construction, but for general excellence, which embodies a loose reed, under picking device, adjustable picking stick and improved shuttle picks. It runs 240 picks per minute and, it is claimed, gives 10 per cent. greater production than the ordinary loom.

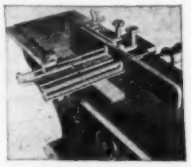
Wool Washing Machine. F. Bernhardt, Leisnig, Germany. The main feature of this machine is throwing the liquor in the form of a spray on the wool, which is said to increase the cleansing power of the liquor.

Rim-Band Stop Motion. Samuel Broadhurst, Royton, England. An automatic attachment for self-acting mules by which the machine is stopped when the rim-band begins to ravel or run slack.

Dyeing and Bleaching Machine. U. Pornitz & Co., Chemnitz, Germany. An improved machine for coloring and bleaching yarn on cops or spools by the continuous circulating system.

CORRECTION.

In the description of the Columbia protector for hand jointers in our September is

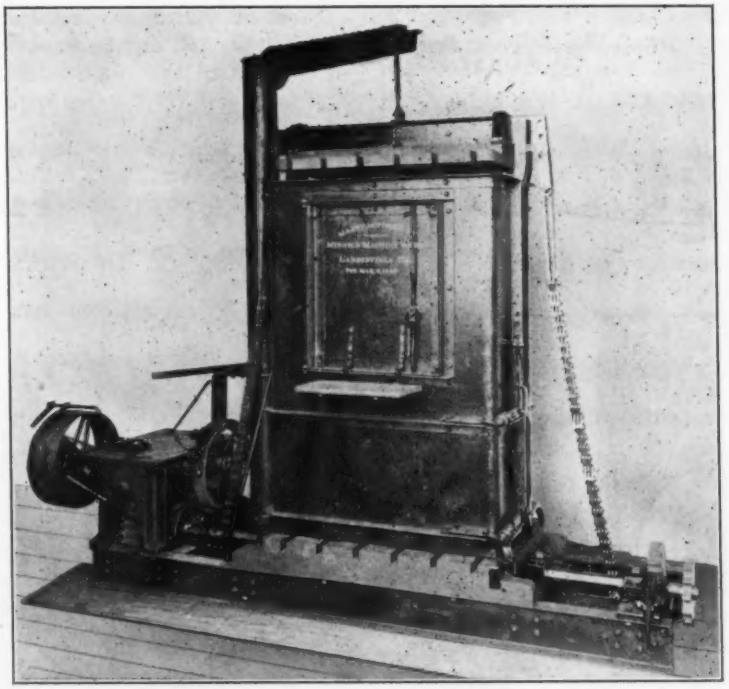


sue a mistake was made in giving the address of the manufacturer, Fred W. Hall, which is Merchantville, New Jersey.

THE MINNICH BALING PRESS.

This press is adapted for cotton, wool, rags, waste, and in fact for all the products that are usually baled. It is built by the Minnich Machine Works, Landisville, Lancaster Co., Pa., and has been successfully used for years by many leading manufacturers and merchants. The construction of the press presents some novel features. When the bale is finished the ends and side are open, leaving the bale clear on three sides. It presses the material down, avoiding the necessity of raising the weight of the bale, bars, followers, etc., and leaving the bale in a convenient position to be sewed and hooped. Being but a short distance above the floor level the bale can be set on the floor or on a truck without any danger of jarring the building by its fall. The press is built so that by a movement of a lever the pressure is instantly released, the spring of the bale sending up the follower. This is a desirable feature when making extra large bales by double pressing, there being no time lost in taking out the bale.

The press is adapted for low studded buildings and can handle all sizes of bales with equal facility. Only one catch is used to open and close the press. The press is set on the floor, which is not cut, and on which there is no pressure except that of the weight of the machine. The builders claim that the press can be operated in half the time required for other presses on the market and is unequaled for power, strength, simplicity and durability. It is built to be operated by either hand or power in sizes suited to the products to be baled. The hand press is used for waste products in stores and requires very little room, the builders stating that if there is room for a rag pile there is room for the press. The cover is counter weighted so that as soon as the bale is tied and the pawl released it returns automatically to the position for the next pressing.



THE MINNICH BALING PRESS

Among the firms using the Minnich press

are the following: Lowell Waste Company, Lowell, Mass.; American Thread Co., Providence, R. I.; Southern Bagging Co., Norfolk, Va.; South Atlantic Waste Co., Charlotte, N. C.; Mente & Co., New Orleans, La.; John Wanamaker, New York and Philadelphia; Simpson-Crawford Company, New York; Lord & Taylor, New York; Siegel-Cooper Company, New York; Siegel, Cooper & Co., Chicago; Butterick Publishing Company, New York; Strawbridge & Clothier, Philadelphia; Gimbel Bros., Philadelphia; N. Snellenburg & Co., Philadelphia; Ladies' Home Journal, Philadelphia; Bureau of Engraving and Printing, Washington; Post-Office Department, Washington; Government Printing Office, Washington; U. S. Envelope Company, Worcester and Hartford; Germain's 5 and 10 Cent Stores; Woolworth's 5 and 10 Cent Stores.

The builders are ready to install a press on 30 days' trial and will be pleased to supply any further information.

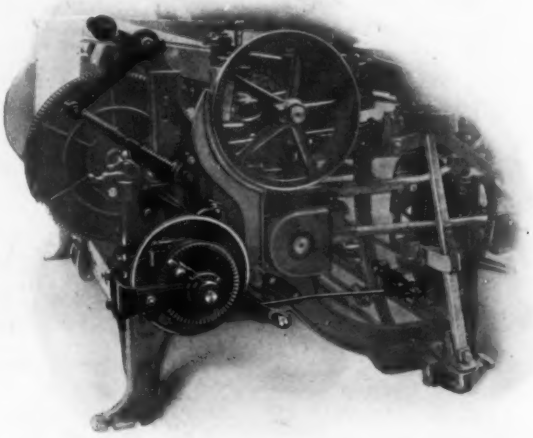
A HUMIDITY SCALE.

Because of the growing interest in the importance of moisture in textile materials reference to the humidity scale shown in the accompanying illustration is especially timely. This scale was invented by Wm. D. Hartshorne, agent of the Arlington Mills, Lawrence, Mass., and is manufactured by the Parker Manufacturing Co., 6 Clifton St., Boston, Mass., its operation being based on the high moisture-absorbing qualities of wool. As shown, a skein of yarn is hung from one side of a wheel carrying a pointer, being balanced by a weight on the other side. As the degree of moisture in the skein increases or decreases the pointer vibrates to the right or left and indicates the variations. It is claimed that with ordinary care this scale will give results that make it more satisfactory than the stationary wet and dry bulb thermometer.

THE HARTSHORNE HUMIDITY SCALE.

THE DRAPER-ROPER LET-OFF.

The Draper Co., Hopedale, Mass., state they were the first to introduce automatic let-off motions for looms, having put Bartlett let-offs on 50,000 looms before 1870. They add that all let-off motions which are governed by the tension of the warp are manifestly affected in their action if the work of operating the letting-off device increases. As the yarn weaves off the beam, and the diameter of the yarn circle on the beam grows less, the Bartlett and other let-offs of its class operate their controlling mechanism through less leverage, thereby



THE DRAPER-ROPER LET-OFF

bringing greater strain and counteracting the tension of the warp to just the extent of the increase. This requires a tighter warp to produce the same effect, and the extra tension on the warp narrows the cloth woven. The only way of counteracting this evil is to lessen the friction on the let-off, and for very accurate results the friction should be carefully adjusted at several periods during the weaving out of a beam.

In attempting to perfect let-off mechanism the Draper Co. have aimed to produce a device that should be fully automatic, using an even amount of strain by gradually changing the leverage as the let-off devices received greater motion. They incorporated a follower or pressing-arm resting against the yarn on the beam and changing its position as the yarn circle varied. Change of position of this presser changed the fulcrum of the lever operating the let-off pawl, and practical tests have shown that an even tension is maintained during weaving, other conditions remaining the same. The let-off does not govern all conditions affecting width of cloth as this may be varied somewhat by the amount of moisture in the filling, the set of the pick, etc. By obviating the main difficulty, however, the Draper Co. claim that they produce much more uniform cloth than with any other device.

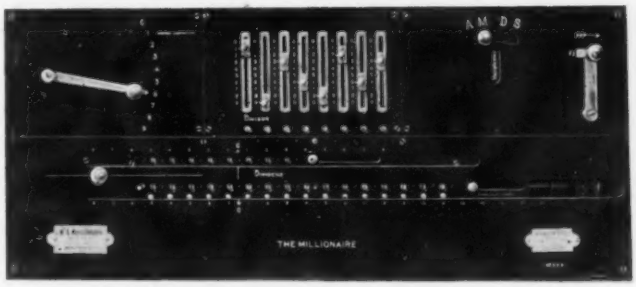
They have profited by experiments with different gearing and have lately perfected the detail by providing an outside bearing and also furnishing an ingenious hand-operated clutch by which the beam can be easily released for turning backward or forward. They make no extra royalty charge for use of this let-off on their own loom, but do not apply it to looms of other make.

THE "MILLIONAIRE" CALCULATOR.

Calculating machines are coming into very general use in manufacturing establishments and commercial offices. Banks and financial institutions have already discovered their great value. One reason which has prevented many business establishments from adopting them is because the earlier machines were more or less complicated and required an expert to operate them. Machines are now to be had which are simple and may be used by any intelligent person without expert training.

The "Millionaire" calculating machine is adapted for all calculations involving addition, subtraction, multiplication or division, which include practically all the requirements of ordinary business. The chief feature that distinguishes it from other machines is that only one turn of the crank is required for each figure in the multiplier or quotient. For example, to multiply or divide by 9 requires but one turn, whereas in other machines it is stated that nine turns are necessary. The American agent of the "Millionaire" calculator, W. A. Morschhauser, 1 Madison Avenue, New York, claims that this feature results in a saving of four-fifths of the time and labor required for business calculations. It is easy to learn to operate it and it is incapable of making a mistake, the results of carelessness being readily apparent. It is simple in construction and made in accordance with the highest standards of Swiss workmanship.

In the textile industry such a machine is especially valuable owing to the great number of calculations to be made daily. A demonstration of the "Millionaire" calcu-



THE "MILLIONAIRE" CALCULATOR.

iator can be arranged on application to Mr. Morschhauser, who is confident of his ability to demonstrate its superiority over other machines. He will also furnish a list of users and testimonial letters on request.

A FOUNTAIN MARKING AND STENCIL BRUSH.

This brush, used for marking and stenciling cases, works like a fountain pen, the ink being stored in the handle and flowing to the brush as required. It is a great convenience

FIG. 1.

for every class of shipping and can be carried in the pocket, dispensing with the inconvenience of carrying a marking pot from case to case. The manufacturers, The Universal Fountain Brush Co., 100 East 129th St., New York, state that it will mark from 100 to 150 cases with one lot of ink, and is suited for marking on boards, iron, stone, etc.

Fig. 1 shows the marking brush. Fig. 2 shows the stencil brush. The bristle tips are made of an extra quality of bristles and when worn out can be replaced, the new tips being inexpensive. They are made with stiff

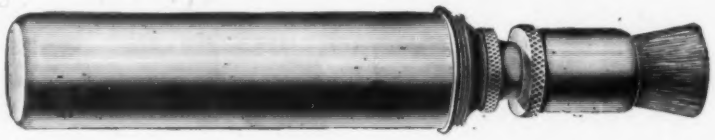


FIG. 2.

bristles or camel hair as desired. The flow of ink is regulated by turning the top to the right or left. The manufacturers claim that four cases can be stenciled with this brush to one with the ordinary brush, as one sweep does the work.

During the last ten years the wool sales in Australia, apart from wool exported for sale in England and the Continent, have increased from 775,000 to 1,288,000 bales.

A DYEING MACHINE.

An automatic dyeing machine, recently patented in this country, is shown in section at Fig. 1. The tank is open at the top and built with converging sides as shown. Within the tank is a removable receptacle for the material. This is of the same shape

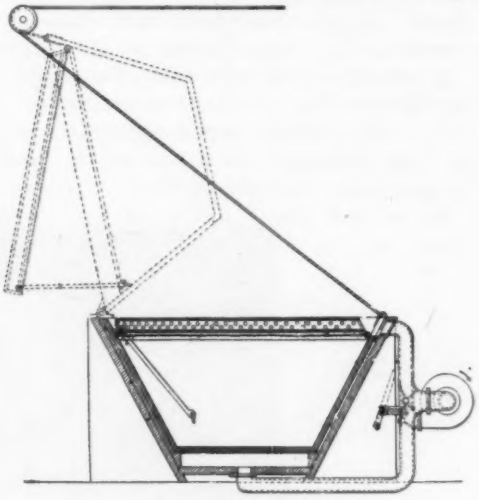


FIG. 1.

as the tank, but of slightly smaller dimensions.

Extending over the top of the receptacle, a slight distance below the top, is an open frame, which is hinged at one of its ends, as shown at 10. This frame carries a screen, which extends entirely over the receptacle; arranged above the screen, and extending down through the central portion of the receptacle, is a pipe which is secured to and carried by a frame. The end wall of the frame is arranged on an incline opposite to the incline of the adjacent wall of the receptacle, and extends to the hinge and into engagement with the wall of the receptacle, to provide a small chamber separate from the receptacle. One end of the pipe opens into

the chamber and the opposite end of the pipe is closed. The side walls of the pipe are provided with perforations which gradually increase in number from the end of the pipe communicating with the chamber to the opposite end. If the dyeing liquor is introduced to the chamber it will flow through the pipe and out through the perforations into the receptacle, the gradually increasing number of perforations insuring an equal distribution of the dyeing liquid.

The bottom of the receptacle is provided with perforations to permit the dyeing liquid to flow vertically through the receptacle and tank.. Extending around the interior of the tank, a slight distance above the bottom, is a ledge upon which the receptacle rests within the tank. The purpose of this ledge is to support the receptacle within the tank, and provide a space below into which the dyeing liquid may be forced and caused to flow up.

When the parts occupy the position shown in the drawings, and the pump is driven in the direction indicated by the arrow, the dyeing liquid will be drawn by the pump from the bottom of the tank through the pipes, and discharged through into the chamber, from which it is distributed throughout the upper portion. During the operation of the pump the dyeing liquid will circulate and flow downward. When the valves are reversed, the dyeing liquid will be drawn by the pump and discharged into the bottom of the tank, thus causing the liquid to flow or circulate upwardly. Thus the contents of the receptacle are thoroughly subjected to the dyeing liquid.

SYSTEM IN REINFORCED CONCRETE CONSTRUCTION.

BY J. P. SLACK.

The problems which the prospective mill builder has to face are not those of loft or office building construction, even though a structure of similar size is desired. The live load and vibrating strain to which mill construction must of necessity be subjected present peculiar problems. To make an intelligent decision as to the type of structure best adapted to meet any and all exigencies of the modern mill, an intelligent consideration of the qualities peculiar to the various types of construction now in use must first occur. In reinforced concrete we find a medium of construction possessing in theory advantages of slow burning mill construction together with other good qualities peculiar to itself, and lacking many of the disadvantages of the older style construction.

Two factors have obviously entered into the situation as regards concrete. First, the very newness of the material in such use has made experimental work necessary. Second, the comparative ease with which concrete work of some sort may be put together has led certain inexperienced, uneducated and in some cases, unintelligent contractors to attempt work for which they possessed neither the training nor the ability to execute properly. The result has been in certain quarters to discredit what is probable, in proper hands and under intelligent supervision, the best form of building construction known. The cause of many of the recent failures of reinforced concrete structures has been a lack of system.

As a business without system is foredoomed to failure, so is any building operation unless in it is embodied the result of a carefully developed system. As an example of the effective application of a carefully developed system in reinforced concrete work, along lines of considerable magnitude, a description of the methods of Frank B. Gilbreth, a well-known contractor of New York, will serve the purpose. It is interesting to analyze the system which makes one contractor so successful with a piece of reinforced concrete work, while others, through lack of such system, are partially or wholly unsuccessful. More than isolated cases can be cited where contractors have torn down the few remaining parts of a reinforced concrete building which had not previously met such fate without assistance. Both here and abroad reinforced concrete work has been performed with such apparent ease that, to the layman, it would seem to be the acme of simplicity to accomplish results; to take cement, sand and broken stone, mix them together in certain proportions, place the mix-

ture in molds, and finally imbed the steel. An explanation of the Gilbreth system will indicate the reason why such operations can accomplish nothing but failure.

Not long ago a widely exploited cement company gave wide circulation to a small book whose text was devoted to telling how remarkably easy and in what innumerable ways concrete could be used on the farm. Among other interesting things the book showed pictures of a model piggery, sanitary, durable and cheap beyond belief, constructed entirely of concrete, even to the trough for the hogs' food. The foreman in charge of this work not being provided with a stove to warm his shanty had, it was stated, remedied that condition by placing a nail keg within a barrel, and then filling the intervening space with concrete. The result was a fine little stove, duly pictured in the book. The inference was that anyone could do a concrete job if provided with the proper materials and a copy of the aforementioned little volume.

The effect of such systems of publicity, of which the above is but an instance, as might have been expected, was to impress the reader with the idea that concrete work could be performed by a layman, effectively and easily. On the other hand, the numerous failures which have been reported from time to time in structures more or less pretentious, have given rise to a feeling of timidity in some quarters.

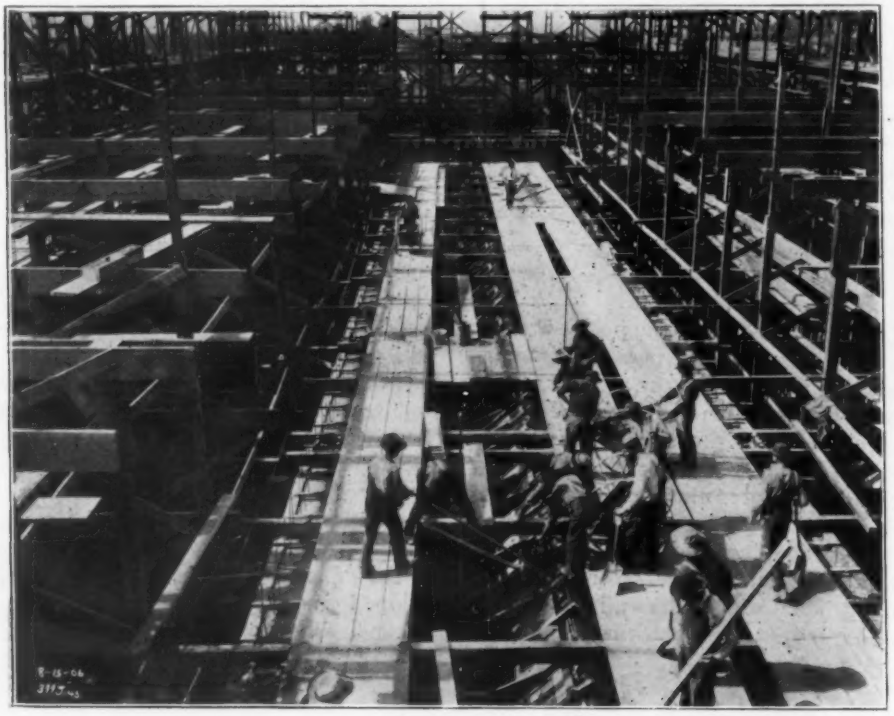


FIG. 1. THE CONCRETE BEING POURED INTO THE HOPPER BOTTOM OF A COAL BUNKER.

While it really is simple and successful under intelligent supervision with careful attention to strains, stresses and design, the present situation seems to be that the attitude of laymen in general divides them into two classes; those fearing reinforced concrete, and those to whom concrete appears as simple as making mud pies. An essential point of difference between reinforced concrete as applied to building construction and the other common forms of material put to similar use, lies in the fact that concrete, while being placed in position is not in its ultimate condition, while with regard to all

other building materials, the opposite is true. To design and build a modern reinforced concrete building, requires years of intelligent study and training in order to get results which are worth while.

After the architect and engineer have completed plans for a reinforced concrete building, it remains for the contractor to make shop designs preparatory to fabricating the steel reinforcing rods into the proper dimensions. At the same time, carpenters are occupied with designing and building the wooden molds which are to receive the concrete and its reinforcements. From the point of view of economy, these molds are best made from parts systematically assembled, which can be used as units for repeated use. In this way the molds necessary in completing the structure may be furnished with the least expenditure for lumber and labor possible, without jarring the setting concrete. The last is an important point, since the jarring of concrete during the setting stage has a most injurious effect, often destroying the homogeneity.

The cement used must be thoroughly tested, as very great variance is possible in its quality. A test formerly considered adequate was to determine its tensile strength a few days after mixing with water. In the light of more recent information, this test is now one of the least important. The testing of cement is now a matter of chemistry as well as of physics. After a proper chemical analysis, it should be determined whether swelling or shrinking will take place during the hardening and ageing period. The best test for this is to force chemical action by boiling. This accomplishes within a few hours what it would take years for ordinary atmospheric action to accomplish. The steel must also be subjected to various tests. It must be so designed that the completed work will stand up under the working loads for which it was intended, even though workmen have occasionally been careless in plac-

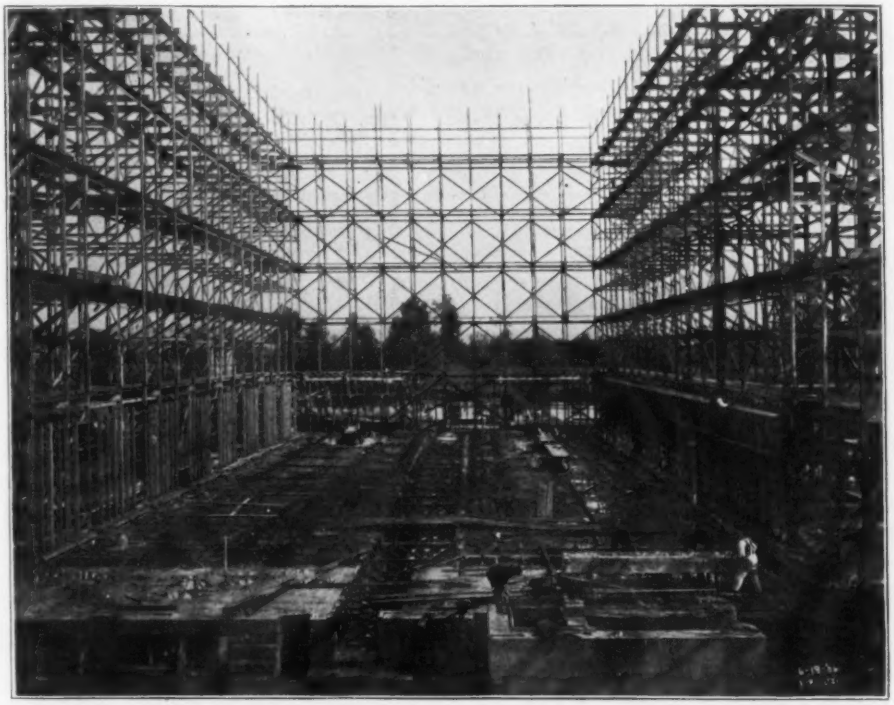


FIG. 2. THE ENGINE ROOM END OF THE BOILER ROOM.

ing it. Under actual working conditions samples of the concrete taken from the wheelbarrows of the workmen must be tested.

After this comes what is perhaps the most important step in the entire undertaking, the correlation and handling of all the foregoing elements, from a labor standpoint, with the best workmanship and the greatest economy. As an illustration of how reinforced concrete is performed under a successful system, may be taken the power station at Seattle, built by the Gilbreth organization, immediately after the San Francisco disaster. The result of the good showing made by concrete at this time influenced the owners to abandon the brick and steel plans formerly intended, and to substitute reinforced concrete.

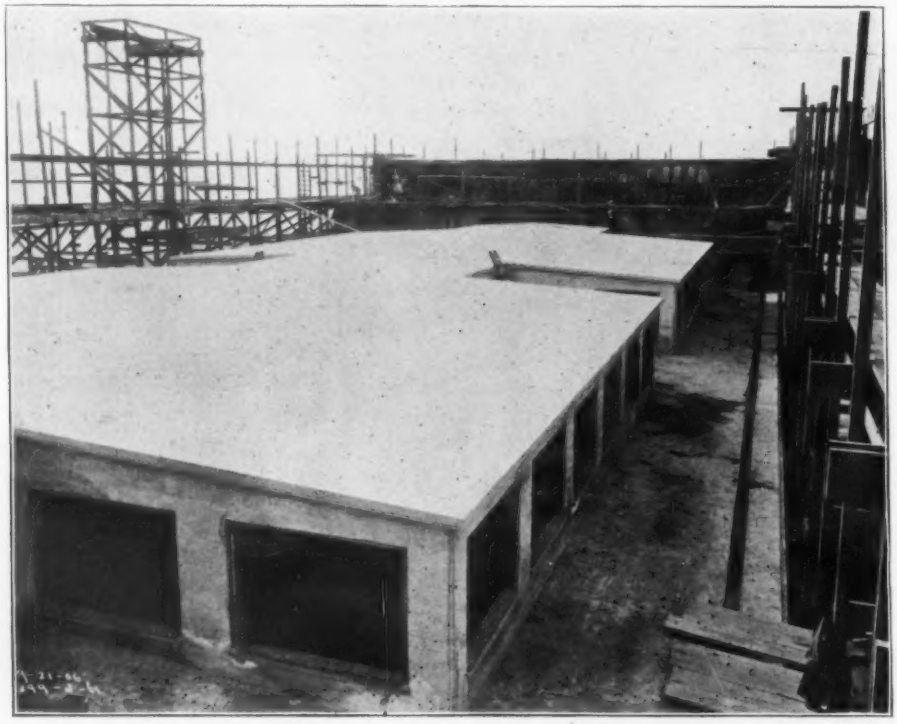


FIG. 3. THE FINISHED CONCRETE MONITOR ROOF OF THE BOILER HOUSE.

While awaiting the revised plans of the building the Gilbreth organization, which operates under the written system, proceeded with the construction of the foundations. The superintendent in charge divided the foundations into longitudinal halves. The same number of men were put to work on each half, each gang under its own foreman, and with concrete mixing machines of the same capacity. Thus the two gangs were evenly matched, as if in an athletic contest. In a similar manner the work of the scaffolding was subdivided. Two sets of double elevators were installed for the lifting of material, one set on each side. This idea of subdividing the work and racing the gangs was not original with the superintendent in charge, however. It forms one of the written rules of the Gilbreth "field system," a small book prepared for the instruction and guidance of all men in the steady pay of that organization.

Below are quoted a few pertinent extracts from the book, which has been an important factor in educating the members of this organization to the point where they can be

assembled anywhere and at any time, like the duplicate parts of a model machine.

"Every superintendent and foreman should use special effort at all times to secure a greater speed, consistent with economy. Speed is more often secured by organization than by crowding the work with a large number of men."

"There is no way in which speed can be obtained so easily, with so little confusion and with so little trouble to the superintendent and foreman, as by dividing the job into several portions, and then dividing any one kind of work into several smaller portions, and placing a working foreman and the same number of men on each portion."

"Workmen like athletic contests, and will enter into the spirit of them quite as quickly and with the same rivalry as a trained college team. Therefore, the men will be interested in their work to a larger extent, if it is understood at the time that several gangs start on the several pieces of work, that there is to be a contest."

"Contests of this kind not only give great speed and reduce cost, but they also enable the superintendent to recognize the ability of foremen and mechanics, and promote them to higher positions."

"In carrying out this scheme, careful attention must be given to the following points:

"(a) The work should be divided into similar portions and conducted under approximately the same conditions.

"(b) The same number of men should be on each portion.

"(c) The same amount and kind of plant should be utilized on each portion.

"(d) It has been found advisable in some cases to arrange the men in accordance with their nationality, or other bonds of sympathy.

"(e) Recognition in the form of promotion or increase of pay to the working foreman whose men do the best and most work."

"If a concrete wall is to be constructed, it can generally be divided up into rows of columns and bays, and if the same number of rows of columns be given to the same number of men, and careful statistics kept as to which one can set up the most columns in a given time, there is no doubt but that more work can be accomplished in competition than otherwise."

"By careful study a superintendent can divide up nearly every part of his work on this basis. By so doing there will be less trouble for the foreman in charge. Money will be saved for the owner."

The staging for supporting the forms was built in accordance with standard office drawings, developed and perfected under the "cash-prize-for-improvements" system. This system is the outcome of a desire to secure the co-operation of employes, thereby tending toward improvement in every part of the business. In furtherance of this end, a plan has been adopted whereby employes may have an incentive to make suggestions, with the assurance that all suggestions will have careful and impartial consideration. Any suggestions which are of value qualify those making them to compete for a series of prizes which are awarded monthly to employes offering the best suggestions. Suitable boxes are placed in the offices as well as on the jobs, and blank cards are provided on which suggestions are recorded. The cards are dropped into the boxes and collected weekly. For each suggestion that is accepted the sum of one dollar is awarded. On the first Monday of each month the employes who have made suggestions of the greatest value during the preceding month are awarded cash prizes in the order of the value of the suggestions.

The result has been that every employe is taking the keenest interest in his work, and endeavoring in every way to advise some method of simplifying his own work or that of one of his fellow employes. While the foundations were being constructed, the steel was being fabricated, and the forms built on the ground in readiness for the time when they were to be assembled. Like the staging, the forms were constructed according to standard office drawings, tried out and incorporated into the written system. When put together they fitted and were taken down with little effort and without jarring the concrete and used over again. Likewise every rod was placed 1 1/2 inches back from the surface of the concrete in order to be protected from the heat of fire.

The foregoing is but an outline of how system is applied to reinforced concrete construction.

At Fig. 1 the concrete is being poured into the hopper bottom of a coal bunker, which extends the whole length of the boiler house. The staging on either side is carried up to support the roof. The forms for the hopper bottom are similar to a vertical wall.

Fig. 2 is a view looking from the engine room end of the boiler room. The staging for the outside walls is complete and the uprights for the basement outside walls are in position. The reinforced concrete conduit is below the boiler room basement floor and the openings in the foreground are ready to receive the reinforcement of the engine room columns.

Fig. 3 is a view of the finished concrete monitor roof of the boiler house.

Dyeing, Bleaching, Printing, Etc.

BENZINE, AND THE CLEANSING OF FABRICS.

BY LOUIS J. MATOS, Ph. D.

The present article is the result of recent work on a somewhat large scale in the handling of certain volatile solvents for the cleansing of textile fabrics.

For a number of years the so-called art of "dry-cleaning" has made great inroads in the older and more cumbersome processes of cleaning, and is due to the fact that the material treated is not only cleaner when finished, but is left in a much better condition, and, depending upon the quality of solvent employed, more or less free from residual odor.

In treating textiles, preparatory to cleansing with volatile solvents, it is necessary to dry them thoroughly, for the reason that any moisture acts in retarding—even if not absolutely preventing—the removal of oils, greases, etc. When the goods are perfectly dry, the action of the solvent is instantaneous, and the time of treatment is very much shortened. The goods are usually soaked in the benzine or naphtha in closed vats, but there are a number of practical forms of rotary washers that are used to the best advantage. The form recently used by the writer was constructed of heavy sheet iron with a rather large opening, provided with a lid which was bolted in place securely and which prevented any leakage. Inside of this stationary cylindrical iron chest or drum was a horizontally revolving cage made of wooden slats, and in which the material to be cleansed was placed, and which, when revolving, tumbled the goods about, and caused all portions to be treated exactly alike.

The duration of the washing with benzine is about half an hour in the first machine, and then followed by a rinse in a second machine with fresh benzine, or the rinsing may follow the washing in the same machine, removing the dirty benzine to the still for recovery. Benzine used once for rinsing may be generally used without purifying as the first wash for dirty material.

From the rinse, the goods are taken to the closed extractors, constructed in a similar manner to the washers, but revolving at a much higher rate of speed, when the excess of solvent is removed and allowed to flow back into a storage tank for future use. When the material has been extracted, the goods are dried in a current of air from a suitable blower, and then made ready for finishing.

Many attempts have been made from time to time to produce a substitute for the petroleum distillates that are now almost exclusively used, but without any very great success, except in the case of carbon-tetrachloride, which is equally powerful as a cleanser, without any action on fibres or colors, and is not dangerous to handle, so that the element of fear that always is present whenever benzine, etc., is used, can be ignored. Carbon-tetra-chloride as usually sold for cleansing purposes has an odor very closely resembling chloroform. It is water-white, mobile, does not mix with water under any condition, and being of greater density than water, immediately sinks and in this regard is much superior to benzine, which always rises to the top. Carbon-tetrachloride is not inflammable, and does not ignite or give off vapors that cause explosions; if a small quantity of the fluid be placed in a cup, and a lighted match brought to it, no flash is seen, and if the match is gradually immersed in the liquid the light is extinguished. Further, if a small quantity of the fluid is placed in a wide mouth bottle or can, and agitated for a few moments, so that the air in the can may become charged with the vapors, and a match introduced, no flash is seen and no "puff" heard; the flame on the match, however, is tinged with green, and is quickly extinguished. Another experiment made was to saturate a sheet of paper with

the fluid and light it, the result being that the paper burned with no greater rapidity after soaking than the unwetted paper.

These tests are reasonably conclusive that this newer solvent possesses all advantages heretofore held by benzine and the additional one of safety from a fire standpoint, but up to the present the price is somewhat prohibitive except in establishments where large quantities can be kept in use all the time, and where a complete plant for recovery and redistillation (purifying) can be maintained.

At one time it was claimed that the vapors of carbon-tetra-chloride were poisonous, but many tests made upon animals and birds, besides the records of cases where human beings were overcome with the vapors, lead to the belief that it has no greater injurious qualities than gasolene or benzine.

Benzine (gasoline and naphtha) will, however, continue to be the chief cleansing agent for a long time to come, and consequently efforts will continue to be made to secure from it the maximum of efficiency, and this has led to the use of certain compounds known as "benzine soaps," that is, compounds possessing certain detergent properties that are easily soluble in hydro-carbons, leaving no residue. These so-called soaps are peculiar substances, and even today are not thoroughly understood by either the manufacturers or consumers. They are essentially lime-soaps which have been emulsified with a small quantity of water at the same time that a relatively large amount of benzol, benzine, gasoline, or other similar fluid is added, the result being that a very thick, smeary mass is formed, and which rapidly loses its good qualities unless it is kept in closed vessels.

Such a "soap," when previously dissolved in a small quantity of benzine, and then added to the main portion, produces a cleansing solution that removes practically all dirt and grease of any kind that is removable by means of volatile solvents.

Redistillation of benzine is a matter of importance, and a steam still is a necessary part of the plant, for without one, it would be impossible to handle the fluid in a satisfactory manner, as no other means exists by which the fluid can be purified and made available for further use. At one time it was thought that simply shaking with water would remove the impurities sufficiently to enable the benzine to be used again, but the small quantity of water taken up by the benzine destroyed its good qualities.

Benzine cleansing plants should be designed and constructed with great care, so that there is no possible chance for vapors to collect and ignite from stray sparks, that there is no leakage, and finally that the room or shed where the work is done on the material to be cleansed is so completely ventilated that the workmen can be present at all times without any danger to themselves.

The stock benzine should be stored in an iron tank located in a stone or brick structure, situated some distance from the works proper. Suitable pipes leading to and from this building should be laid underground, or if overground, protected from damage in troughs. A storage tank should be put in to receive the dirty benzine from the washers, and this can also be located in the storage house, and preferably buried partially in the ground.

The first washer should be located so that it can be easily charged with fluid either by gravity or by air pressure, and the second washer or rinser should be located so that its contents can be easily run off into the first washer without using an intermediate tank.

The driers should be located in the open yard, or else on top of a building, but at any rate in such a place that the soaked material will not have to be conveyed any distance on account of the inflammable vapors.

Regarding the names, benzine, gasoline, and naphtha, considerable confusion exists, and unless the buyer is posted, he is liable to be misled in his purchases by receiving goods that "look" and "smell" similar to the material wanted, but which is not exactly what is wanted. Perhaps the best parallel that can be given is to compare gasoline with absolute alcohol, naphtha with deodorized alcohol, and benzine with ordinary 94 per cent. alcohol. Gasoline is the most expensive of the three hydrocarbons mentioned, and benzine is the cheapest, and should have a gravity varying from 62° to 57° Beaume, and with a boiling point of 270° F. more or

less. Every benzine cleansing plant should make use of a small petroleum hydrometer (the cost of which is very small; seventy-five cents will buy a fairly good one adapted for ordinary use). This instrument is standardized at 60° F., and for every 10 degrees of temperature above 60, one degree on the benzine scale must be subtracted, and for every 10 degrees below, one degree must be added.

It is a mistake to use benzine that has not been deodorized, as such fluid will invariably leave an odor in the goods, while discolored benzine should be at once rejected. Sometimes benzine is discolored accidentally with paraffine oil, which is yellowish, and which cannot be removed from the goods after they are once impregnated with it. Benzine which has a slight bluish tinge (fluorescence) is certain to be contaminated with kerosene or burning oil, and while such a benzine will not discolor any textiles, yet a peculiar odor remains which can be removed only by a prolonged airing.

DYEING IN COPPER VESSELS.

Numerous azodyes which are fixed by chroming suffer a considerable change in color by the action of even small quantities of copper. This change is especially noticeable in such monoazodyes as are derived from the nitroaminophenols and their sulphonic acids. It has consequently not been possible to dye these colors in copper vessels; in fact, they are so susceptible to the action of copper that the presence of copper pipes or valves in the dye-vessel frequently precludes their employment.

L. Cassella & Co. have found that the action of the copper can be prevented if the fibre is first boiled for some time with the dyestuff in a neutral bath in presence of a chromate, and is then caused to dye by the addition of acid.

As an example, the dye bath is first made up with the requisite quantity of the dyestuff from nitrodiazophenol and 1.8 amidonaphthol sulphonic acid, with the addition of 1/2 per cent. bichromate, raised to the boil, and boiled for one hour. Then 1/3 per cent. acetic acid is added and the boiling is continued for one-half to one hour.

CHEMICAL TESTS IN THE BLEACHING PROCESS.

BY FREDERIC DANNERTH, Ph. D.

While practical experience is essential to success in bleaching as in all other departments of textile manufacturing, yet it is only by a combination of scientific methods with the empirical knowledge that comes by daily experience that the best results are obtained. For this reason an account of a number of chemical tests in bleaching cotton goods will be of general interest. The object of these tests may be classified as follows:

1. Determination of fatty matter in the finished fabric.
2. Determination of lime soaps in the finished fabric.
3. Determination of ash in the finished fabric.
4. Detection of oxy-cellulose in the finished fabric.
5. Detection of chlorine in the goods as they come out of the acid (sour or antichlor) bath.
6. Detection of acid in the goods after rinsing (before drying).
7. Determination of strength of the antichlor bath.
8. Comparison of the color of the bleached cloth with accepted standards.
9. Detection of lime, resin and bleach spots.

The estimation of the fats, resins and waxes which have been left in the fabric is carried out with a sample weighing about 100 grains. This is extracted in a Soxhlet apparatus with petroleum ether which has been recently distilled to remove any tarry matter. The amount of solvent necessary is found by filling the Soxhlet extractor until the contents siphon off freely. Some excess should be allowed for loss by evaporation. The dry extraction flask should be accurately weighed before use. If the extractor has siphoned off regularly the operation will be finished in about 90 minutes. The extraction flask is now placed on a water-bath, whereby the solvent distills off and the fats, etc., remain. The increase in weight of the flask will show the amount of grease and the like present in the weighed

sample. The amount of fatty matter permissible in well bleached goods is usually taken as .05 per cent., but it is quite possible to produce cloth with as little as .025 per cent. The amount of fatty matter present could also be calculated from the loss in weight of the fabric. In this case the sample must be dried at 220° F. and accurately weighed both before and after extraction.

2. The ideal bleached fabric contains no appreciable amount of lime soaps. As, however, nearly all natural water contains some lime salts in solution the formation of a small quantity of this insoluble soap can hardly be avoided; another cause of their presence is the boiling off of the cloth in the kiers. If lime is used, the waxy matters which are softened by the process are very prone to combine with it to form a soap. A third source of the trouble is the imperfect washing of the goods before bleaching. The estimation of the amount of calcium soap present is carried out as follows:

A sample which has been thoroughly degreased in a Soxhlet extractor is immersed for thirty minutes in a mixture of 5 parts (by weight) of concentrated hydrochloric acid and 95 parts of distilled water. Wash well and dry. By this operation the lime is converted into soluble calcium chloride while the free fatty acid remains on the fabric. Extract with petroleum ether as before. The fatty acids may be weighed and reported as such, or they may in addition to this be dissolved in alcohol and titrated with 1/20 normal caustic potash solution, using phenolphtalein as usual. The maximum amount of fatty acid in the form of lime soap permissible in properly bleached goods is .05 per cent. If this amount is exceeded the souring and rinsing operations require investigation.

3. Although the raw cotton lint contains as much as 1.65 per cent. of ash, pure cellulose leaves on ignition no ash at all. This gives another method by which to determine the perfection of the bleach, for the object in bleaching is to remove all extraneous matter and obtain the cellulose in as pure a form as possible. Whether or not the operation has been successful may be judged by the amount of mineral matter which a sample of the fabric leaves on ignition. Take about a 100 grain sample, determine its weight accurately, cut into small pieces and place in a porcelain crucible. Now burn off the organic matter until the remaining ash is white or light gray. The increase in weight of the crucible will show the amount of mineral matter present in the sample taken; it should not exceed .1 per cent. This ash consists essentially of calcium oxide and a small amount of silicates. The former is due to the lime soaps in the fabric, while the latter is attributed by some to mechanically adhering matter with which the raw cotton is sometimes wilfully adulterated.

4. The detection of oxycellulose is of extreme importance as careful tests have shown that its presence not only interferes with the dyeing of level shades, but also considerably affects the tensile strength of the fabric. This weakening of the fibre becomes especially evident in the subsequent treatment of the fabric with alkalies or soap, so that it may escape notice until the goods are finally sold at retail. The housewife then discovers to her dismay that the goods appear rotten after the first washing.

The formation of the oxycellulose is generally caused by undue exposure of the goods to light and air after removal from the bleach bath; then again it may result from the use of very strong bleach baths. The chemical change which takes place is in both cases an oxidation. The test usually recommended to determine the presence of this oxidation product depends upon its affinity for the basic coloring matters. Five parts of methylene blue are dissolved in 1,000 parts of boiling water. The moist fabric is now immersed in this for about ten minutes and then washed. The presence of oxycellulose is indicated by spots or stripes in the fabric which have been dyed a bright blue while the rest is only slightly tinged. This test, though apparently simple, requires some experience if the results obtained are to be properly interpreted.

Another excellent test is carried out as follows: Boil the fabric thoroughly in water in order to remove any finishing materials. Then squeeze and boil for five minutes in a mixture of 30 parts of Fehling's solution and

20 parts of water. A red coloration due to the deposited cuprous oxide (Cu_2O) indicates the presence of oxidized cellulose. This oxidation product may be prepared artificially by saturating a fabric with bleach solution and then exposing in an atmosphere of carbon dioxide.

5. In order to obtain a purer white and to remove the excess of chlorine from the fibre the goods are passed through the acid bath. As this treatment with muriatic acid often leaves the goods harsh many bleachers prefer to use sodium hyposulphite ($Na_2S_2O_3$) or sodium bisulphite ($NaHSO_3$) and thereby ensure a soft feel. If used in sufficient quantity these substances effectually remove the chlorine which remains in the goods after the bleach bath, according to the following reactions:

$$2\ Na_2S_2O_3 + 2\ Cl = 2\ NaCl + Na_2S_4O_6$$

$$NaHSO_3 + 2\ Cl + H_2O = 2\ HCl + NaHSO_4$$

To determine whether all the chlorine has been removed the washed fabric is immersed in a 10 per cent. solution of potassium iodide to which a few drops of boiled starch solution have been added. The appearance of a blue color indicates the presence of free chlorine. In this case the "antichlor" bath was not strong enough.

6. The presence of free mineral acid in cotton goods which are to be exposed to high temperatures is extremely detrimental to the strength of the fabric. The goods may be tested by moistening with a few drops of a yellow solution of methyl orange. Free acid will turn the color to red.

7. The strength of the antichlor bath should be determined after each lot is run through it. We wish to assure ourselves that an excess of antichlor has been used; in other words, that there was enough present to unite with all the free chlorine in the goods and so render it harmless. The reagent for this test is prepared by dissolving 1 part of iodine and 2 parts of potassium iodide in 100 parts of water. A tumblerful of the liquor from the antichlor bath is taken and to this is added a few drops of a solution of boiled starch. If the iodine solution be then added drop by drop the solution in the tumbler should not be colored blue. This means that the antichlor bath is still effective.

8. When observing the color of bleached cloth, i. e., the purity of the white attained, the cloth should always be laid double and examined in a good north light, otherwise a dark background may detract from the appearance of the goods. Two lots of the same goods run consecutively may yet appear of different tints even though the bluing was the same in both cases. This is often due to a difference in the yarn used. The cream white, which is usually undesirable, is corrected by tinting with ultramarine or methyl violet. The fact that various coloring matters are at present used for this purpose makes it difficult at times to compare bleached garments purchased at different stores. Before concluding that one fabric is more valuable than another because of the purity of the white color it would be well in some cases to make a comparative test of the tensile strength of the two samples.

9. The detection of the presence of lime and of resin spots in a lot of goods is especially important in case they are to be afterward dyed with alizarine colors. The best test is to dye a 100-grain sample of the bleached goods with alizarine red according to the usual method, whereby the spots will show up distinctly.

Finally reference should be made to a test which is serviceable in the case of bleached linen cloth. Well bleached linen should not be discolored when steeped in a 10 per cent. solution of ammonia. If the linen is colored at all yellow by this treatment it is an indication that the pectin and waxy matters have not been properly removed.

BAST SOAP AND BAST SOAP SUBSTITUTES IN SILK DYEING.

Bast soap is the product of the degumming of silk. It consists of sericine and the excess of the soap used in degumming, and, of course, it is in a liquid state on account of the water which has been used in the first instance. This liquor, when added to the dye bath after being mixed with water in the proportion of from one to two gallons to twenty, makes the silk take up the dye more

slowly, and hence prevents any diminution of the lustre of the fibre. The degumming is usually effected in three operations, and requires about an hour and a half. The soap baths are made weaker each time. When the soap bath is so saturated with sericine that it can degum no more, it can be used in dyeing as such or as is preferable in certain cases, it can be precipitated with milk and lime. When this is done, the lime soaps are filtered off and decomposed with hydrochloric acid. In this event, the only use of the acids liberated is to make more bast soap from the filtrate.

Bast soap is used for the most part in dyeing unwoven silk, but it is essential that the soap should be produced on the spot, as it does not pay for carriage.

In dyeing in acid baths with bast soap, all excess of acid must be avoided. Any superfluous acid tends in the first place to unlevel dyeing, and in the second place to defective penetration. At the same time an acid reaction is, of course, necessary, but the weaker it can be made the better.

The function of bast soap in silk dyeing is strictly analogous to that of Glauber's salt in cotton dyeing, and it is impossible to dye silk without its assistance, or at least without the help of a reliable substitute. For the benefit of silk dyers who have not the opportunity of getting bast soap, i. e., of those who receive the silk already degummed, we append two reliable recipes for making a substitute for the natural silk:—

A.
Marseilles soap	10 lbs.
Pale glue or gelatine	2 lbs.
Olive oil	½ lb.
Common salt	1 lb.
Water	50 gals.

The ingredients are boiled together. No special precaution is necessary. When the solution is used as a substitute for bast soap, the addition of acid, whether acetic or sulphuric, must be made more slowly than in the case with bast soap proper.

B.
Marseilles (olive oil) soap	50 lbs.
Pale glue or gelatine	8 lbs.
previously dissolved in	
Water	220 gals.

The whole of these ingredients are boiled up together, and used in the same way as the A. recipe.—Farberei und Appretur.

Separate Selling Agencies for the Badische Co. and Farbenfabriken of Elberfeld Company.

The following announcement and circulars have been issued relative to the sale in the United States of the products hitherto handled solely by the Continental Color & Chemical Co.

CONTINENTAL COLOR AND CHEMICAL CO.

New York, October 1, 1907.

The CONTINENTAL COLOR AND CHEMICAL CO. has had the sole sale in the United States of the products manufactured by the

BADISCHE ANILIN & SODA FABRIK OF LUDWIGSHAFEN A/RH.

and the

FARBENFABRIKEN VORM. FRIEDR. BAYER & CO. OF ELBERFELD,

but in order to further the development of the business and to facilitate the introduction of new products it is deemed advisable to have a separate selling agency for each of the two Works; we refer to the enclosed circulars.

Remittances for amounts due to the Continental Color and Chemical Co. may be made to either of the two selling agencies.

Thanking you for the favors which you have extended to us and hoping that you will accord your patronage also to our successors, we remain,

Yours respectfully,

CONTINENTAL COLOR AND CHEMICAL CO.

BADISCHE ANILIN & SODA FABRIK.

Ludwigshafen a/Rh., Germany, October 1, 1907.

Referring to the announcement of the Continental Color and Chemical Co., we beg to inform you that we have given the sole sale of our products in the United States and in Canada to the

BADISCHE COMPANY

with offices in New York at 128 Duane Street,
Boston at 86 Federal Street,
Providence at 80 So. Water Street,
Philadelphia at 238 Arch Street,
Chicago at 228 Randolph Street,
Montreal at 6 Lemoine Street.

Soliciting a continuance of your patronage, we remain,

Yours respectfully,

BADISCHE ANILIN & SODA FABRIK.

BADISCHE COMPANY.

New York, October 1, 1907.
128 Duane Street.

Dear Sir: Referring to the circular of the Badische Anilin & Soda Fabrik, we beg to advise

that we have the sole sale of the products of this Company.

The high standard of the quality of their goods will be maintained. We solicit a continuance of your favors and hope to merit the confidence which you reposed in our predecessors who had the sale of these goods, the Continental Color and Chemical Co. and Messrs. Kuttroff, Pickhardt & Co.

Yours respectfully,
BADISCHE COMPANY,
Adolf Kuttroff, President,
Carl Pickhardt, Vice-Pres.

FARBENFABRIKEN

VORMALS FRIEDR. BAYER & CO.

Elberfeld, October 1, 1907.

Dear Sir: We herewith beg to inform you that we have entrusted the sole sale of our products in the United States and Canada to the

FARBENFABRIKEN OF ELBERFELD COMPANY

with offices in

New York:	66 Lafayette Street
Boston:	32 India Street
Providence:	27 Pine Street
Philadelphia:	9 and 11 North Water Street
Chicago:	133 East Kinzie Street
Charlotte:	509-513 Trust Building
Toronto:	14 Front Street, East

We solicit the continuance of your favors and remain,

Yours respectfully,
FARBENFABRIKEN VORMALS FRIEDR. BAYER & CO.

FARBENFABRIKEN OF ELBERFELD COMPANY.

New York, October 1, 1907.
66 Lafayette Street.

Dear Sir: Referring to the circular of the Farbenfabriken vormals Friedr. Bayer & Company, we beg to advise you that the sole sale of the products of this company in the United States of America and Canada has been again entrusted to us.

We shall also be the sole sales agents in the United States and Canada for the products of the Hudson River Aniline Color Works, of Albany, N. Y.

We solicit the continuance of your favors, and shall make every endeavor to merit your confidence in our products.

Yours respectfully,
FARBENFABRIKEN OF ELBERFELD COMPANY,
I. J. R. Muurling, President.

DYEING WOVEN FELTS.

In the dyeing of textile fabrics, especially with indigo, considerable difficulty is usually encountered in obtaining perfectly level effects, but more especially complete penetration of the color. For this reason woolen fabrics dyed in the piece are found to be considerably lighter inside than on the surface and in those places where they are most subjected to friction in wearing, they become lighter in color. Hitherto, this difficulty has been overcome by dyeing the wool in the loose state or in the yarn, but this mode of procedure unduly enhances the cost of the material.

A German inventor claims to have got over the difficulty by means of the following simple device: The pieces are impregnated on a padding machine with the solution of the mordant or dyestuff, the excess of liquor being then removed by suction, so that every fibre throughout the thickness of the material is evenly impregnated. The dyeing or fixing process proper now follows, the goods being either boiled in an ordinary dye bath or the color (or mordant) fixed by steaming, drying, or by the application of a fixing agent. In the dyeing of indigo sufficient air comes into contact with the fibre during the suction process to oxidize the Indigo White. The following examples are given:

Example 1.—A piece of uniform cloth or felt is impregnated on an ordinary padding machine with a solution of bichromate containing an assistant such as formic acid, lactoline, tartar, etc., and is then passed through the suction machine. The concentration of the bichromate is such that after suction the piece retains, for instance, 1 1/2 per cent. bichromate of potash and 1 1/2 per cent. formic acid. The piece is then boiled in an ordinary piece dyeing machine for about half an hour, or it may be steamed in order to fix the mordant. For dyeing, the piece is impregnated with an alizarine or wood color, submitted to suction, and treated again as above.

Example 2.—In order to ensure penetration of indigo, the piece is dyed in an indigo vat, submitted to suction, developed in an acid bath and again submitted to suction. For dark shades these manipulations may be repeated.—Jour. Soc. Dyers and Colorists.

The number of cotton spindles in Austria-Hungary is estimated at the present time to be 3,609,000.

Color Cards.

Chrome Fast Black; Berlin Aniline Works, New York.

Sixteen samples showing 8 and 9 per cent. dyeings of Chrome Fast Black P3, P4B, PB, PT, on raw wool, woolen yarn and piece goods. Four of the samples are of men's suitings showing white effect threads not colored by the dye.

Alizarine Rubinole R; Continental Color & Chemical Co., New York.

A new red wool dyestuff shown in four shades on yarn and piece goods, ranging from 1/2 to 3 per cent. of color. One of the samples shows the effect obtained by printing.

Diamine Brown MR; Cassella Color Co., New York.

Eight samples showing the effects obtained by dyeing cotton yarn, raw cotton and cotton and union piece goods with different percentages of Diamine Brown MR.

DYE RECIPES.

The following recipes appear in the Dyers' Supplement, which is issued each month by the TEXTILE WORLD RECORD. The Supplement contains the colored samples, dyed according to recipes given. The selection of samples is carefully made, and it is the aim to show shades which are of especial interest to the dyer, and which the requirements of the market demand. The Dyers' Supplement is a 16-page pamphlet, in convenient form for preservation. Subscription price for the Dyers' Supplement $1.00 per year.

Recipe No. 145.

Orange on Cotton Yarn.

Tetrazo Orange R R on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Tetrazo Orange R R.
(American Dyewood Co., 154 William St., New York.)
25 lbs. Common Salt.

Enter at 180° F. and dye at a boil for one hour.

Tetrazo Orange R R is of interest for producing bright orange shades of excellent fastness to light.

Recipe No. 146.

Blue on Cotton and Wool Union Cloth.

Naphtamine Union Blue L M on 100 lbs. cotton and wool union cloth. Prepare the dye bath with

5 lbs. Naphtamine Union Blue L M.
(Kalle & Co., 530 Canal St., New York.)
25 lbs. Common Salt
in
250 gals. water.

Bring to a boil in 30 minutes and boil for 45 minutes. Shut off the steam and work 20 minutes longer.

Naphtamine Union Blue L M is a bright color and dyes both cotton and wool a uniform shade.

Recipe No. 147.

Yellow on Cotton Yarn.

Brilliant Phosphine 5 G on 100 lbs. cotton yarn. First mordant the yarn by working in a bath containing

2½ lbs. Tannic Acid

at a temperature of 180° F. for 1/2 hour, and then allow to steep in the gradually cooling bath for several hours, or over night. Squeeze, without washing, and work for 1/2 hour in a bath containing

2 lbs. Tartar Emetic.

Wash, and dye in a bath made up with

2 lbs. Brilliant Phosphine 5 G.
(A. Klipstein & Co., 122 Pearl St., New York.)
2 lbs. Alum.
10 lbs. Glauber's Salt.

Dye at a temperature between 150° to 160° F. for one hour. Wash and dry.

Brilliant Phosphine 5 G is exceedingly fast to alkalies and washing, and also to acid, and is suitable for the dyeing of yarn for cross dyeing purposes.

Recipe No. 148.

Reddish Brown on Cotton Yarn.

Katigen Red Brown 3 R on 100 lbs. cotton yarn. Prepare the dye bath with

First Bath.

12 lbs. Katigen Red Brown 3 R.
(Continental Color & Chemical Co., 128 Duane St., New York.)
12 lbs. Sodium Sulphide.
6 lbs. Soda Ash.
40 lbs. Glauber's Salt.

Standing Bath.

7.2 lbs. Katigen Red Brown 3 R.
(Continental Color & Chemical Co., 128 Duane St., New York.)
7.2 lbs. Sodium Sulphide.
2 lbs. Soda Ash.
8 lbs. Glauber's Salt.

Dissolve the color, along with the sodium sulphide, and add this solution to the dye bath, to which the necessary amount of soda ash has already been added. Boil up the bath and add the Glauber's salt, and dye for one hour at a temperature just below the boil.

Katigen Red Brown 3 R possesses good fastness to light, acids, cross-dyeing, washing, and alkalies.

Recipe No. 149.

Blue on Worsted Yarn.

Compound Shade on 100 lbs. worsted yarn. First mordant the yarn in a bath made up with

3 lbs. Potassium Bichromate,
2½ lbs. Tartar, or Lactic Acid,

entering the material at 120° F. and mordanting for 1 1/2 hours. After mordanting, rinse and dye without drying, if possible, in a bath made up with

4 lbs. Alizarine Blue O Extra.
2 lbs. Alizarine Blue N.
(C. Bischoff & Co., 451 Washington St., New York.)

Dye at a boil until the dyestuff is completely exhausted, and then an additional 15 minutes to thoroughly fix the color.

When dyed in this manner, this combination will be found to possess excellent fastness to light and washing.

Recipe No. 150.

Brown on Cotton Yarn.

Dianil Chrome Brown G on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Dianil Chrome Brown G.
(H. A. Metz & Co., 122 Hudson St., New York.)
2 lbs. Soda Ash.
20 lbs. Glauber's Salt.

Enter material at 140° F. and dye at a boil for one hour. Then after-treat in a bath made up with

2 lbs. Blue Vitriol,
2 lbs. Potassium Bichromate,
3 lbs. Acetic Acid,

working in this bath for 1/4 hour at a temperature of 195° F., and then thoroughly washing.

Dianil Chrome Brown G is excellently suited for the dyeing of union goods, its fastness being superior to that produced with the ordinary direct cotton browns, and the fastness is increased considerably without materially affecting the shade.

Recipe No. 151.

Blue on Worsted Yarn.

Chrome Blue X R on 100 lbs. worsted yarn. Prepare the dye bath with

6 lbs. Chrome Blue X R.
(C. Bischoff & Co., 451 Washington St., New York.)
15 lbs. Glauber's Salt.
5 lbs. Acetic Acid. (Sufficient to exhaust.)

Enter yarn at 140° F., boil one hour, cool the bath, and after-treat in a bath to which

3 lbs. Potassium Bichromate

has been added, at a boil for one hour.

When dyed in this manner Chrome Blue X R will be found to possess excellent fastness to light and washing.

Recipe No. 152.

Red on Worsted Yarn.

Milling Red 6 B A on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Milling Red 6 B A.
(Berlin Aniline Works, 213 Water St., New York.)
10 lbs. Glauber's Salt.

Enter material at 140° F. Raise slowly to a boil and after boiling 1/2 hour, add

4 lbs. Acetic Acid,

and boil for 1/2 hour longer.

Milling Red 6 B A does not stain vegetable fibers, and its fastness is sufficiently good for most purposes.

Recipe No. 153.

Red on Worsted Yarn.

Milling Red G A on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Milling Red G A.
(Berlin Aniline Works, 213 Water St., New York.)
10 lbs. Glauber's Salt.

Enter material at 140° F., raise slowly to a boil, and after boiling 1/2 hour, add

4 lbs. Acetic Acid,

and boil for 1/2 hour longer.

Milling Red G A does not stain vegetable fibers, and its fastness is sufficiently good for most purposes.

Recipe No. 154.

Black on Worsted Yarn.

Acid Chrome Black R H N on 100 lbs. worsted yarn. Prepare the dye bath with

4 lbs. Acid Chrome Black R H N.
(Continental Color & Chemical Co., 128 Duane St., New York.)
10 lbs. Glauber's Salt.
3 lbs. Sulphuric Acid.

Enter the yarn at 175° F., bring slowly to a boil and then add

2 lbs. Sulphuric Acid

and continue the boiling until the dye bath is exhausted. Then after-treat with

2 lbs. Potassium Bichromate

at a boiling temperature for 3/4 of an hour.

Acid Chrome Black R H N possesses very good fastness to all of the ordinary color-destroying agencies. It does not stain cotton, and is valu-

able for the production of white cotton thread effects.

Recipe No. 155.

Yellow on Worsted Yarn.

Indian Yellow G R on 100 lbs. worsted yarn. Prepare the dye bath with

3 lbs. Indian Yellow G R.
(Continental Color & Chemical Co., 128 Duane St., New York.)
15 lbs. Glauber's Salt.
4 lbs. Sulphuric Acid.

Enter at 180° F. and dye at a boil for one hour.

Indian Yellow G R is a particularly brilliant color and possesses sufficient fastness for most of the uses to which such a color is ordinarily put.

Recipe No. 156.

Blue on Worsted Yarn.

Alizarine Blue O Extra on 100 lbs. worsted yarn. First mordant the material in a bath made up with

3 lbs. Potassium Bichromate,
2½ lbs. Tartar, or Lactic Acid,

entering at 120° F. and mordanting for 1 1/2 hours at a boil. After mordanting, rinse and dye without drying, if possible, in a bath made up with

6 lbs. Alizarine Blue O Extra.
(C. Bischoff & Co., 451 Washington St., New York.)
4 lbs. Acetic Acid.

Dye at a boil until the dyestuff is completely exhausted, and then an additional 15 minutes to thoroughly fix the color.

Alizarine Blue O Extra when dyed in this manner will be found to possess excellent fastness to light and washing.

Recipe No. 157.

Brown on Worsted Yarn.

Anthracene Chrome Brown S W N on 100 lbs. worsted yarn. Prepare the dye bath with

1 lb. Anthracene Chrome Brown S W N.
(Cassella Color Co., 182 Front St., New York.)
10 lbs. Glauber's Salt.
6 lbs. Acetic Acid.

Enter at 120° F., bring to a boil and dye at a boil for one hour.

Add

½ lb. Potassium Bichromate

to the dye bath and after-chrome this at a boil for one hour.

Anthracene Chrome Brown S W N gives an excellent shade of brown which possesses very good fastness.

Recipe No. 158.

Brown on Cotton Yarn.

Dianil Chrome Brown R on 100 lbs. cotton yarn. Prepare the dye bath with

3 lbs. Dianil Chrome Brown R.
(H. A. Metz & Co., 122 Hudson St., New York.)
2 lbs. Soda Ash.
20 lbs. Glauber's Salt.

Enter material at 140° F. and dye at a boil for one hour. Then after-treat in a bath made up with

2 lbs. Blue Vitriol,
2 lbs. Potassium Bichromate,
3 lbs. Acetic Acid,

working in this bath for 1/4 of an hour at a temperature of 195° F. and then thoroughly washing.

Dianil Chrome Brown R is excellently suited for the dyeing of union goods, its fastness being superior to that produced with the ordinary direct cotton browns, and the fastness is increased considerably without materially affecting the shade.

Recipe No. 159.

Black on Cotton and Wool Union Cloth

Naphtamine Fast Union Black G on 100 lbs. cotton and wool union cloth. Prepare the dye bath with

5 lbs. Naphtamine Fast Union Black G.
(Kalle & Co., 530 Canal St., New York.)
25 lbs. Common Salt

in

250 gals. water.

Bring to a boil in 30 minutes and boil for 45 minutes. Shut off the steam and work for 20 minutes longer.

Then after-treat in a bath containing

1 lb. Potassium Bichromate,
3 lbs. Formaldehyde,

for 20 minutes, at 160° F.

Naphtamine Fast Union Black G possesses very good fastness to fulling.

Recipe No. 160.

Orange on Cotton Yarn.

Tetrazo Orange R on 100 lbs. cotton yarn. Prepare the dye bath with

2 lbs. Tetrazo Orange R.
(American Dyewood Co., 154 William St., New York.)
25 lbs. Common Salt.

Enter at 180° F. and dye at a boil for one hour.

Tetrazo Orange R is of interest for producing bright orange shades of excellent fastness to light.

Mill News.

Those interested in receiving early and more complete investigated information of projected new mills, enlargements, improvements, fires facts and gossip of the trade are referred to the Textile Advance News, issued weekly by the publishers of the Textile World Record, at $15.00 per year.

COTTON.

New Mills.

*Alabama, Childersburg. The new plant to be built here by the Coosa River Spinning Co., in which D. L. Lewis (Sycamore, Ala.) and A. DeCort (Boston, Mass.) are interested, will be equipped with 10,000 spindles.

*Alabama, Munford. The Munford Cotton Mills, capitalized at $50,000, will soon start work on erection of their new plant, which they propose having in operation February 1st. They will have an equipment of 2,500 spindles (ring) making 12s to 16s hosiery yarns. N. C. Camp is president of the company and B. F. Camp, treasurer.

*Georgia, Calhoun. A site for the Echota Cotton Mills, recently reported incorporated with capital stock of $100,000, has been selected and construction work on the mill will begin within 90 days. Judge F. W. Harbin is president of the company.

*Georgia, Griffin. J. J. Mangham who is interested in the proposed Cherokee Mills advises us that the new company will be organized during September with a capital stock of $150,000, with the privilege of increasing to $500,000. Construction work on the plant will begin shortly and it is expected that goods will be produced during March or April. Blankets, towels and similar articles will be manufactured. About 300 people will be employed.

Georgia, Manchester. A large cotton mill will be erected at this place by practically the same interests that are operating the Unity Cotton Mills and Elm City Cotton Mills, of LaGrange, Ga., and the Milstead Mfg. Co., of Conyers, Ga. The capitol stock will probably be kept at $500,000, although it is being rapidly taken, and will probably be oversubscribed, such having been the case with all of the enterprises which have been projected by these interests during recent years. Some points concerning the machinery equipment have not yet been decided, but as soon as they are, more definite information will be given out. It will probably be a 15,000 to 20,000 spindle plant. Fuller E. Callaway, treasurer of the Unity Cotton Mills, and C. V. Truett, president of the mills, are actively interested. The other mills controlled by these interests manufacture cotton duck, which is sold through J. H. Lane & Co., of New York.

Massachusetts, Fitchburg. The Houghton Web Company has been incorporated with capital stock of $50,000. The factory, formerly run by the Steel Ball Co. on Lunenburg St., will be remodeled and equipped with new machinery and it is expected will be ready for operations about March 1st. I. S. Houghton is president of the company and W. G. Hayes, treasurer.

*Massachusetts, New Bedford. Plans are completed for the new spinning mill. Preliminary work toward the erection of the plant will be started this fall. A building 4 stories high and 480 by 130 feet is to be built and 70,000 spindles will compose the equipment. About 600 persons will be employed. Mr. Abbott P. Smith, who has been identified with the promotion of several cotton mills, is at the head of the new company.

Mississippi, Columbus. The Columbus Yarn & Textile Mills has been organized for the manufacture of cotton, wool and silk yarn. W. I. Wellman of Huntsville, Ala.; T. W. Hardy and J. A. Stimson of this place are the incorporators. Capital stock is $50,000.

New Jersey, Newton. The new towel mill started by the Standard Towel Co. will manufacture Turkish towels, wash cloths, bath mats and similar fabrics. W. H. Mellor is president and buyer; J. W. C. Carter, treasurer, and J. H. Carter, agent. The company has capital stock of $20,000. Twelve looms are operated.

North Carolina, Belmont. The new cotton yarn mill in which Mr. S. P. Stowe was reported as interested, will be capitalized at $150,000. S. P. and R. L. Stowe; A. C. Lineberger; D. E. Rhyne and other prominent manufacturers are among the stockholders.

North Carolina, Concord. The Edgemere Mfg. Co. has been incorporated with capital stock of $25,000 to operate the Magnolia Mills, No. 2, of this place and the Edgemere Mfg. Co.'s plant at Great Barrington, Mass. Yarn will be manufactured at the Concord plant and quilts, bed spreads, etc., at Great Barrington. 1,800 spindles and 86 looms will be operated. W. M. Greenwood, New York, is president; E. B. Carroll, Great Barrington, is treasurer; and I. B. Covington, Concord and J. M. O'Brien, Great Barrington, superintendents.

*North Carolina, East Monbo. Contract has been let for construction of the new dam across the Catawba River for the Turner Mills Company.

*North Carolina, Gastonia. At a meeting of the directors of the recently organized Dunn Mfg. Co. the proposed capital was increased from $60,000 to $100,000, and it was decided to build a 5,000 spindle plant instead of a 3,000 spindle plant as originally intended.

*North Carolina, Lenoir. A site has been selected for the Moore Cotton Mill Company, recently reported incorporated. It is reported that a 5,000 spindle yarn mill will be erected.

North Carolina, Madison. Plans are being made for the organization of a $100,000 cotton mill. F. B. Kemp is reported as interested.

North Carolina, Mocksville. It is reported that

$45,000 has been subscribed to the proposed capital stock of the new cotton mill to be established at this place. The promoters hope to secure $60,000 to $70,000 and equip a 3,000-spindle mill for the manufacture of cotton yarns. A. M. McGlamery, mayor of Mocksville, is interested in the project.

*North Carolina, Newton. H. F. Smith, general manager and buyer of the Ridgeview Cotton Mill, recently reported incorporated, advises us that construction work on the new building will be begun about the middle of September and it is expected that manufacturing will begin in the spring of 1908. 3,000 spindles will be installed at the start and 30s to 40s two ply yarn will be manufactured. The company is capitalized at $100,000. L. A. Phillip is president. No machinery has yet been contracted for.

*North Carolina, Shelby. J. R. Dover is reported as about to place order for machinery for the new Ella Manufacturing Co., in which he is interested. It is hoped to have the plant running by next summer.

*North Carolina, Stony Point. We have been advised by the Stony Point Mfg. Co. that none of their machinery will be in operation before January 1, 1908, construction work having just begun. The original plans for a 3,000-spindle mill have been changed for a 4,000-spindle mill. The company is capitalized at $80,000 with the privilege of increasing to $125,000. M. K. Steele of Turnersburg, N. C., is pres.; A. L. Watt, Taylorsville, N. C., treas. Cotton yarns from 18s to 22s will be manufactured.

North Carolina, Weldon. A new building, 150 by 50 feet, two stories, brick, will be erected for the Shaw Cotton Mills, recently reported incorporated. This plant will be equipped with 5,000 spindles for making 2 ply, 24 to 36 yarns. It is expected to have the plant ready for production by next February. W. T. Shaw is president of the company.

Ohio, Painesville. The Painesville Weaving Co. has been organized and will begin the manufacture of hammocks, rugs and similar fabrics about the middle of October.

Oklahoma, Guthrie. It is reported that arrangements have been completed for the erection of another cotton mill at this place, and that a site has already been selected. It is further reported that Mr. J. Tearney has invested $30,000 in the project and will take the management of the plant. Wm. H. Coyle is also mentioned as interested in the proposed mill.

*South Carolina, Leesville. The Leesville Cotton Mills Co., recently reported incorporated with capital stock of $100,000, will manufacture cotton yarn from inferior grades of cotton marketed in this vicinity. R. B. Jennings is president and treasurer; J. R. Bowknight, vice president; and W. G. Duncan, secretary and general manager. A site for the plant has been selected and construction work will commence at once.

*South Carolina, Rock Hill. The building for the Harris Mfg. Company, recently reported incorporated is under construction. It will be 75 by 140 feet, and two stories high. Coarse cotton yarns and collar pads will be manufactured.

*South Carolina, Rock Hill. The new cotton mill proposed at this place will be incorporated as the Wymojo Cotton Mills, with capital stock of $125,000. A mill of 5,000 spindles will be built. Details of the plant, which is to be located either here or at Fort Lawn, are being considered. W. M. Moore will be president of the company; J.. B. Johnson, vice president and Sims Wylie (Charlotte), secretary.

*South Carolina, Woodruff. Details of the plant of the W. F. Gray Cotton Mills have been completed. The company has capital stock of $100,000 and will operate 10,000 spindles on cotton yarns. Main mill will be 75 by 325 feet, 3 stories high, and construction work will be started shortly. W. H. Gray is president; W. S. Gray, vice president; and D. B. Irby, secretary.

*South Carolina, Yorkville. Construction work is progressing on the mill for the Lockmore Cotton Mills, recently reported incorporated. The building will be 75 by 300 feet, one story high. About 5,000 spindles will be installed for making 40s to 50s yarns. It is reported that contract for machinery has been let.

Enlargements and Improvements.

*Alabama, Anniston. The equipment of the American Net & Twine Co.'s new mill will be running within a few days. Five thousand spindles have been installed. Seine twines are manufactured.

Alabama, Huntsville. The Merrimack Mfg. Co. has ordered 400 new looms, which will be installed as fast as they are received.

Connecticut, Danielson. The Danielson Cotton Co. is considering plans for an addition to its plant.

Connecticut, East Hampton. A new iron boiler is to be installed in the dye room of the Summit Thread Co.'s plant.

*Connecticut, Willimantic. The Windham Mfg. Co. has installed 30 more looms in the mill.

*Georgia, Carrolton. The work of construction on No. 2 Mill of the Mandeville Mills is well under way and it is being pushed rapidly to completion. 10,000 ring spindles will be installed when the building is completed.

Georgia, La Grange. The Elm City Cotton Mills will increase the capital stock to $350,000 and will probably enlarge the plant.

*Georgia, Sargent. Work is under way on new buildings for the Wahoo Manufacturing Co. This plant will be equipped with 6,200 spindles.

*Massachusetts, Boston. The Acme Thread Works report that they are operating in Mann's Mill with a force of 60 operatives. The capital stock is $35,000. E. R. Dyer is president and manager; L. J. Hazelton, treasurer and secretary. They have a daily capacity of 1,500 pounds of cotton thread.

*Massachusetts, Fall River. Construction work on the new brick spinning mill for the Kerr plant

of the American Thread Co. has been pushed forward so rapidly that the walls are now up to the fourth floor. The new building will be 150 by 300 feet and 5 stories high.

Masachusetts, Lowell. The Appleton Co. will install 250 cotton looms.

*Missouri, Kansas City. The Kansas City Cotton Mills are ordering additional looms in order to increase their equipment.

New Hampshire, Manchester. The Amoskeag Mfg. Co. is installing 1,250 additional looms.

New York, New York Mills. The New York Mills are building an addition to the weaving department. 250 new looms will be installed.

*North Carolina, Concord. Construction work has been started on the new mill for the Brown Mfg. Co. Additional machinery will be installed in order to increase the company's output of 18s to 22s yarn.

North Carolina, Davidson. The directors of the Linden Cotton Mills have decided to install electric motors in place of the present steam power plant. Power will be furnished by the Southern Power Co.

*North Carolina, King's Mountain. The looms are being removed from the Klotho Mills, Inc., to make room for the 2,000 additional spindles which will be installed, as previously reported.

*North Carolina, Lincolnton. Mr. D. E. Rhyne, proprietor of the Laboratory Cotton Mills and the Lincoln Cotton Mills advises us that the addition recently reported is being built to the Lincoln Cotton Mills at South Side. Construction work was commenced two weeks ago. The addition will be 125 by 60 feet. When completed, 4,000 spindles will be installed. 40s to 60s ply yarn is manufactured.

North Carolina, Long Island. It is stated that the Long Island Cotton Mills have decided to increase the capital stock of the company from $50,000 to $200,000 in order to build a new 5,000-spindle mill.

*North Carolina, Mooresville. Machinery has been installed in the Mooresville Cotton Mill, No. 3, and some of the cards and spinning frames are running. 14,000 ring spindles, 2,000 mule spindles, and 480 looms will compose the complete equipment.

*North Carolina, Mt. Holly. Operations will start in October on the new addition to the Albion Co.'s plant. 2,450 new spindles will be installed. Plant is run on 16s to 20s yarns.

*Pennsylvania, Philadelphia. The new mill for S. Rosenau & Co., millinery trimming and braid manufacturers at Darien and Noble Sts., recently reported by us, is soon to be built; the contract for its erection having been let. The plant will cover an area of 54.4 by 110 feet, and will have an exterior facing of brick with stone trimmings. It will cost about $100,000.

*Pennsylvania, Philadelphia. F. W. Maurer & Sons Co. advise that they will install more looms for weaving tapes and narrow fabrics.

Pennsylvania, Philadelphia. The Hoffman, DeWitt & McDonough Co., Cottman and G Streets, Ryers Station, manufacturers of tapes, webbings and "Diamond" stay bindings on 70 looms, report that they are so busy that they are now contemplating the erection of a new building which will triple the size of their present plant. The company has only recently finished the erection of a new office building and warehouse of brick, to take the place of the structures recently destroyed by fire.

Pennsylvania, Philadelphia. H. Goldthorp, manufacturer of curtains and upholstery goods on 18 looms at 1738 N. Second St., has removed his plant to 1415 North St., where he has secured larger quarters and largely increased his production.

Pennsylvania, Philadelphia. The Knecht-Mellon Mfg. Co., Ltd., 1720 Phillip St., manufacturers of narrow fabrics on 20 looms, will remove their plant to 22d and Allegheny Avenue about January 1. It is their intention, after their removal, to make an addition of a number of new looms which will enable them to get out a larger production. At this time they are very busy.

*Rhode Island, Pawtucket. Work has been started on foundation for the new two-story addition to the Smith Webbing Co.'s plant.

Rhode Island, Providence. The Howard Braiding Co. will erect a power house in order to double their power capacity.

Rhode Island, Woonsocket. The Eagle Mills have begun construction work on a new addition to their spinning room. Warping and spooling machinery will be installed. The building will be 100 feet long and one story high.

South Carolina, Edgefield. The Edgefield Cotton Mill has awarded contract for an addition to their plant.

South Carolina, Gaffney. New machinery is being installed in the Irene Cotton Mills. The capacity of the mill is being greatly increased.

South Carolina, Hartsville. Preparations are being made by the Hartsville Cotton Mill to add 6,000 spindles and 125 looms.

*South Carolina, Union. The Union Buffalo Cotton Mills advise that the proposed improvements previously reported are going through. E. E. Page has been engaged to investigate the plant.

*South Carolina, Yorkville. The Neely Mfg. Co. will install 2,600 spindles in its new building instead of 2,000 spindles as previously reported. Contract for new machinery has been awarded.

*Texas. Hillsboro. We have been advised that construction work has begun on the addition to the Hillsboro Cotton Mill. Thirty-six looms will be installed for the manufacture of duck, making a total of 116 looms. It is expected that the new machinery will be in operation about April.

Mills Starting Up.

*Texas, Celeste. The Perrin Cotton Mills will resume operations December 1st. The company has capital stock of $75,000; W. Y. Carver and S. Y. Carver (Farmersville) president and treasurer

respectively. Fred A. Cumnock is agent for the mill. They will make yarns, 8s to 16s, 2 to 10 ply and twines, in skeins, tubes, beams, cones, etc. Will have 5,000 ring and 1654 twisting spindles.

Mills Shutting Down.

*New Jersey, Beverly. The Beverly Textile Mfg. Co., which in December last purchased the machinery and business of the A. C. MacElroy Mfg. Co., manufacturers of quilts and table cloths on 26 looms, have dismantled the plant and removed the machinery to the mill of Frederick Rumpfs' Sons at Eden, Pa., with which it has been consolidated.

Pennsylvania, Philadelphia. It is reported that the Diana Mills, operated by the J. Spencer Turner Co. of New York, on cotton dress goods with 100 looms, will be shut down and the machinery sold.

WOOLEN.

New Mills.

*Massachusetts, Athol. A number of looms have been received for the worsted plant being started by S. G. Hall. Machinery will be set up at once.

Pennsylvania, Philadelphia. The William Steele & Sons Co. has been awarded the contract for the erection of a new two story mill for E. H. Morris of the firm of Morris & Bro., Walnut Lane and Freeland Ave., manufacturers of carpet yarns on 9 sets, 1386 spindles. The new building will be 78 by 245 feet, of slow burning mill construction, with walls of brick. The building will contain a mill room, picker room, stock room, engine room, boiler rooms, and other departments, while part of the first floor will be used as a stable and wagon house. This operation, which will cost in the neighborhood of $100,000, will be started at once.

*Rhode Island, Woonsocket. Operations have commenced in the new Montrose Mill. Woolen and worsted goods will be manufactured.

*Rhode Island, Woonsocket. The new building for De Surmont & Co. has been completed and some of the machinery equipment is being installed. 16s to 70s yarn will be spun on the French system.

*Wisconsin, Menasha. J. M. Stickler, who formerly operated the Mausten Woolen Mills, Mausten, Wis., expects to start a plant for the manufacture of hosiery yarn from low grade stock. The equipment will consist of one set of cards at first and operations will probably be begun early in the spring.

Enlargements and Improvements.

*Connecticut, Broad Brook. The Broad Brook Company reported to be making extensive improvements, has installed 7 new looms and additional finishing machinery. More new looms will be installed shortly. An addition, 43 by 50 feet is being built to the finishing room and machinery has been ordered for a complete shrinking plant.

Connecticut, Central Village. Plans have been completed for a large addition to the Central Worsted Co.'s plant.

Connecticut, Coscob. The Mianus Mfg. Co. will add two stories to the present mill in order to increase its equipment.

*Connecticut, Stafford Springs. The Warren Woolen Company reports that they are simply building an addition to connect two of their buildings. Three new sets of cards will be installed in the addition.

Connecticut, Stafford Springs. T. F. Mullen & Co. advise that they expect a number of new looms within a few days.

Massachusetts, Byfield. The Byfield Woolen Co. has completed extensive improvements to its plant.

Massachusetts, Clinton. The foundation work for a new mill to be built for the Bigelow Carpet Co. has been completed. Work on the erection of the mill will be started at once.

*Massachusetts, Globe Village. The Hamilton Woolen Co. reports that the reported change consists of tearing down an old building and replacing it with the new one. No new machinery will be required.

Massachusetts, Graniteville. The three story addition, 113 by 79 feet, being built to the Abbott Worsted Company is nearly completed.

*Massachusetts, Lawrence. Work is nearing completion on the new dye house for the Washington Mills. It is expected to have the building ready for installation of machinery in about two weeks.

*Massachusetts, North Adams. Operations have been started on the looms (90) recently installed in the new weave shed for Waterhouse & Howard. Of this number 70 were removed from the old part of the mill. Spinning frames and twisting machines are being installed in space left in the old building.

*Michigan, Sault Ste Marie. The Soo Woolen Mills are installing machinery in the addition recently built for them.

New Hampshire, Newport. A new boiler house, 36 by 40 feet, with 90 foot chimney stack, will be built for the Brampton Woolen Company.

Pennsylvania, Bristol. Edward T. Steel & Company have added 40 broad looms to their weaving equipment.

Pennsylvania, Philadelphia. It is reported that the Hirst-Roger Co., manufacturers of tapestry and velvet carpets and rugs on 75 looms, are about to build a large addition to their present plant at Allegheny and Kensington Avenues. The company has a capital of $60,000. Richard Hirst is pres.; John T. Kommer, sec. and treas., and William Greene, supt.

Pennsylvania, Philadelphia. John Boggs Sons, located at 2561 Trenton Avenue for a number of years, have recently removed their establishment to the S. E. Corner of Howard and Berks Streets. They are manufacturing ingrain carpets on 29 looms.

*Rhode Island, Pawtucket. The new weave shed being built for D. Golf & Sons is nearly completed. The machinery has been contracted for.

*Rhode Island, Providence. The new mill being

built to the Olneyville section of the Colwell Worsted Mills is practically completed and machinery is now being transferred from the old plant.

*Rhode Island, Providence. The new dye house for the Weybosset Mills of the American Woolen Co. is nearly completed. It is a one-story structure, 152 by 32 feet.

SILK.

New Mills.

Connecticut, Manchester. The plant formerly operated by Matchett Brothers has been leased by Max Schlesinger of New York, and will be started up within a few days. David Matchett will be manager of the plant. Ladies' dress silks will be manufactured.

New Jersey, Paterson. The Todd Mill on Van Houten St. has been sold to Robert Muller & Co. for $45,000. The new owners are a German firm manufacturing hat bands and it is understood that 60 looms will be installed and the mill placed in operation at once.

New Jersey, Paterson. The Standard Broad Silk Works is a new concern which has recently been started at 93 River St. J. M. Wachmann is president and superintendent of the plant, equipped with 10 looms.

New Jersey, Paterson. Samuel Aiken, formerly superintendent for W. Little & Co., is reported to start a plant for manufacturing broad silk in the Dordoni Mill, on River St. Will start with equipment of 12 looms.

*New York, Dunkirk. The C. R. Morley Company has been incorporated with a capital stock of $50,000. This company has been negotiating for a site on which to build a mill at this place.

*New York, Homer. The Knepka Silk Throwing Company has been incorporated with a capital stock of $3500 and is operating several machines. Geo. P. Yager is president, W. G. Crandall, treasurer, and Chas. H. Knepka, superintendent. They anticipate enlarging the equipment within a few months.

*New York, Middletown. Work has been completed on the new Decker & Kimble Silk Mill and operations will be started in full shortly.

New York, New York City. The Acme Throwing Co. has been incorporated with a capital stock of $20,000. Angelo DeVilleneuve of Paterson, N. J., Adolph F. Schmacher and George M. Cassenas of New York are the incorporators.

Pennsylvania, Easton. A new concern to be named the Florence Silk Mfg. Co. will be incorporated and establish a plant at this place.

Pennsylvania, Wilkesbarre. The Empire Silk Company which operates mills at Paterson, N. J., and at Carbondale, Pa., has purchased the buildings of the Morgan Company and will install 48 looms to be operated on broad silks. It is expected that manufacturing will begin by September 1st.

Enlargements and Improvements.

Connecticut, Norwich. Fifty new silk looms are being installed in Givernaud Bros. mill.

*New Jersey, Paterson. Lappin & Long, recently reported as starting a broad silk plant in the Addy Mill, are about to add a number of new looms.

New Jersey, Paterson. The Stuyvesant Silk Co. is moving from the Dordoni Mill to South Allentown, Pa.

New Jersey, Paterson. David Ross, manufacturer of broad silks, has moved his equipment from the Paiget Mill to 260 Grand St.

New York, Brooklyn. Kaltenbach & Stephens expect to start their annex at Allentown, Pa., by November 15th. A number of looms have recently been ordered.

New Jersey, Weehawken. The American Silk Co. contemplates building an addition to their mill at this place.

New York, New York. Jos. Samuels & Co., 29 W. 20th Street propose doubling the present equipment of their mill.

Pennsylvania, Allentown. Klotz & Bregenzer, proprietors of the silk mill at Rittersville, have awarded contract for a 2-story building. When completed, 22 looms will be installed.

*Pennsylvania, Easton. The new building for R. & H. Simons has been completed and a number of velvet looms installed.

Pennsylvania, Philadelphia. The Oxford Silk Co., 110 Oxford Street, manufacturers of silk ribbons on 27 looms, are putting in three new looms to increase their production. The company has a capital of $30,000. W. H. Trainer Kerr is president; Louis H. Petzoldt, treasurer, and Emil Scherr, manager and superintendent. The production is sold through New York.

*Pennsylvania, Scranton. The reported increase in equipment of the Renard Silk Co., Inc., consists of 20 new knitters, 12 twisters and 3 power reels.

Pennsylvania, Wilkesbarre. The Laurel Silk Mfg. Co. is considering plans for a large addition to its plant. It is expected that the building will be completed and machinery installed by December 1.

MISCELLANEOUS.

Georgia, Chickamauga. The Crystal Springs Bleachery Co. has decided on plans for its bleachery for cotton goods, to be established at this place. The main building will be 347 feet long, 150 feet of which will be 3 stories, 156 feet 2 stories, and the remainder 1 story high. The building will be 80 feet wide. Construction work is to begin within a few days. A. S. Bowen and D. A. Jewell are actively engaged in managing the new enterprise.

Massachusetts, Fitchburg. We have been advised that a company has been started under the name of the Glenn Mills Mfg. Co. for the manufacture of cotton waste. The Glenn Mills are located at W. Fitchburg and were formerly owned by the Hoffman-Corr Mfg. Co. of Philadelphia. Machinery will be installed at once. Mary A. O'Connor and John Arsenault are the proprietors, and Maurice J. O'Connor is agent and buyer. For the present the post-office address is 104 Beach Street, Fitchburg.

Massachusetts, Indian Orchard. The Indian Orchard Co. will occupy the space being vacated by the removal of the Rhode Island Worsted Co.'s machinery to their new plant at Stafford Springs, Conn.

Massachusetts, Somerville. The Standard Fibre Co. has been organized with a capital stock of $24,500. Wm. B. Scofield, Jas. W. Brock and Harry E. Hanson are the incorporators.

*New Hampshire, Milford. The Middlesex Linen Co. is erecting a building to be used as a bleach house.

New Jersey, Fairview. The Bellman Brook Bleachery Co., bleachers and finishers of cotton goods, are making extensive additions to their plant. A filtering plant with capacity of 1,000,000 gallons per day is being installed by Hungerford & Terry, filtration engineers, Pennsylvania Bldg., Philadelphia. Capital stock of this company is $300,000. Benj. I. Ward is president; Leo. Van Keuren is treasurer; and Daniel Gee, superintendent.

New Jersey, Passaic. The Passaic Print Works who are making extensive alterations and improvements to their plant and power department have recently contracted with Hungerford & Terry, filtration engineers, Pennsylvania Building, Phila., for the installation of one of their latest and up-to-date filtration plants.

New Jersey, Paterson. The silk dyeing plant of Kearns Bros. is to be enlarged by the erection of an addition, 100 by 200 feet, one story high. It is expected the construction work will be completed during the latter part of November.

Pennsylvania, Allentown. Lotte Bros. Company are building an addition, 35 by 55 feet, which will be used for finishing.

Pennsylvania, Lansdowne. William Hall & Company whose plant was recently burned, are installing machinery for the manufacture of linen towels.

Pennsylvania, Philadelphia. The Standard Hosiery, Dyeing and Finishing Works, Frankford Avenue, have completed installation of a sulphur black dyeing apparatus. Other improved machinery will also be added.

Pennsylvania, Philadelphia. The York Finishing Works has just been started up in the Bromley Mills at Jasper and York streets. The plant has been equipped with the latest machinery for the finishing of hair cloth and other fabrics.

Pennsylvania, Philadelphia. John Bray, printer of hosiery for the trade, has removed his plant to larger quarters at Collins and Westmoreland Sts. He was formerly located at 2042-44 E. Fletcher St.

Pennsylvania, Philadelphia. Messrs. Charles B. Krause & Son, 4220 N. 4th St., are exceedingly busy on cotton and wool Venetian rag, domestic, and wool Terries, cottage carpets, and colonial rugs. This plant which has been operated for many years by hand is being equipped with motors, etc. Five more power looms will be added. Orders have not yet been placed.

Pennsylvania, Philadelphia. H. Feldstein & Co., 4264 Paul St., Frankford, manufacturers of hair cloth on 30 looms, are increasing the capacity of their plant by an addition of 10 more looms. They are very busy.

Pennsylvania, Reading. It is reported that an addition, 70 by 20 feet, will be built to the new plant of the Reading Dyeing Co.

Pennsylvania, Wilkesbarre. It is reported that the Wilkesbarre Dyeing Co. is about to be started up with Geo. H. Craven, formerly connected with the Scranton Yarn Finishing Co., as manager. The company will make a specialty of mercerizing cotton yarn in singles. They expect to be able to make deliveries within a month.

Rhode Island, Pawtucket. It is stated that the Shaker Thread Company, of which H. A. Warburton, Jr., is manager, has leased a part of the plant formerly occupied by the New England Thread Company.

*Rhode Island, Providence. Operations have started in the branch plant of R. Wolfenden & Sons. Spooling and winding worsted yarns is done.

Rhode Island, River Point. It is stated that a brick structure will be erected near the plant of the Continental Finishing Co., for a large lace factory. The new company will be capitalized at $100,000, and about 200 hands will be employed.

*Texas, El Paso. The El Paso Chemical & Fibre Co. advises that construction work on their new mill started Sept. 1st and is expected to be completed by January 1. Rope and twine will be manufactured. The company is capitalized at $50,000. A. Courchesne is president; W. F. Tooley, treasurer; and Dr. F. Thatcher, manager. Steam and electric power will be used.

FIRES.

Connecticut, Norwich. Fire at the Preston Woolen Mill (a branch plant of the Reliance Worsted Company) caused a loss of about $30,000

Pennsylvania, Chester. The shoddy plant of James Bowers Sons at 6th and Madison Sts. containing 10 cards, 4 pickers and 6 Garnetts, was recently damaged by fire. Loss is placed at $5,000. The buildings, it is said, will be repaired as soon as the insurance is adjusted.

Pennsylvania, Philadelphia. A fire which caused loss of $75,000 recently started in the plant operated by John T. Bailey & Co., Front and Tasker Sts., manufacturers of ropes, twines and bags. The fire started in the storeroom of the mill but its origin is not known.

Pennsylvania, Philadelphia. The Glen Rock Mills, Morris & Ott, proprietors, located at Burnside and Apple Sts., Manayunk, was recently slightly damaged by fire. The mill is run on cotton, merino and woolen yarns, with 4 sets and 2400 spindles.

Utah, Brigham City. The Brigham City Woolen Mills have been destroyed by fire. The loss is estimated at $10,000. John Anderson has recently been running part of the plant on cotton batting and woolen products. Mr. Anderson carried a

small insurance on his stock, but the property and machinery were not insured.

FAILURES AND SUSPENSIONS.

Connecticut, New Boston. Geo. T. Murdock & Son, proprietors of the woolen mill at this place, have filed a voluntary petition in bankruptcy. Liabilities $188,051.64; assets, $146,772.10.

Pennsylvania, Philadelphia. Creditors have filed a petition to have Robert J. McDowell, operating the Belgrade Carpet Mills at 2137-2143 E. Firth Street, under the name of McDowell Bros., adjudged an involuntary bankrupt. The petitioners and their claims are: John W. Carson, $1,189.14; W. & R. Ford Manufacturing Co., $350, and the N. J. Fromuth Co., $68.11. The mill is operated on ingrain carpets with 20 looms.

FACTS AND GOSSIP.

*Delaware, Smyrna. The machinery of the Bitzer Hosiery Manufacturing Co.'s plant has been sold by Wm. M. Hope, the receiver.

Georgia, Albany. John A. Betjeman and associates are reported as interested in establishment of another cotton mill at this place. They propose organizing a company with capital stock of $200,000 and will equip plant with about 10,000 spindles and 300 looms for making print cloths.

*Georgia, Griffin. The capital stock of the proposed Cherokee Mills has been increased from $150,000 to $200,000. Construction work will begin shortly.

Georgia, Ocilla. J. A. J. Henderson and associates are reported as interested in organizing a company to build a cotton mill at this place. It is stated that $60,000 has already been subscribed.

Georgia, Savannah. A knitting department is to be added to the Savannah Cotton Mills.

*Illinois, Chicago. The property of the Schwartz Knitting Co., recently reported bankrupt, will be sold at public auction.

Illinois, Chicago. A new three story building to be equipped with an electrical plant and a 450 h. p. gas producing plant, is to be built by Oscar Heineman, silk manufacturer, at Armitage, Fairfield and Washtenaw Avenues.

*Illinois, Rockford. The organization of the Windlund Knitting Co. has not yet been completed.

Illinois, Zion City. The sale of the Zion Lace Industries to Marshall Field & Co., of Chicago, has been completed. $200,000 was paid for the property according to report.

*Maryland, Oella. The plant of W. J. Dickey & Sons was offered for sale, but was withdrawn, the highest bid being $190,000; about $400,000 under the valuation placed on the property by the owners.

Massachusetts, East Brookfield. It is reported that Wm. J. Shutt of Woonsocket, R. I., will start up a plant for the manufacture of velveteens.

Massachusetts, Fall River. As soon as the insurance adjustment is completed, the work of rehabilitating the Shove Mills will proceed rapidly.

Massachusetts, Fall River. It is reported that contract has been let by the American Thread Co. for an electric power plant to be added to the Kerr Mills. The building will be 75 by 75 feet and two stories high.

Massachusetts, Methuen. The dyeing and finishing department of the Tremont Worsted Co. will be located at the Tekcips Dye Works, which the former company recently purchased.

*Massachusetts, Needham. The removal of the Geo. E. Wye Co.'s plant to South Framingham is reported to take place about October 1st.

*Massachusetts, New Bedford. Damage caused by the recent fire in the La Fontaine Braiding Co. has been repaired and the plant is being operated as usual.

Massachusetts, Pittsfield. There is a possibility of a silk mill being located at this place. A representative of a silk cloth manufacturing company has been looking for a suitable site.

Massachusetts, Spencer. Mr. Jos. F. Wicks plans to erect a new brick mill on the site of the old Wicks mill recently destroyed by fire. It is reported that a company will be formed and $50,000 invested in the project.

Massachusetts, Worcester. The report that the Jamesville Mill, operated by P. G. Kent, would resume operations, is without foundation. The mill closed September 16 on account of lack of orders.

Nebraska, Omaha. There is some talk of the organizing of a company and building a mill at South Omaha for the manufacture of woolen goods. Mr. Peters and Mr. Moeler of the Union Pacific R. R., are reported as interested in the project.

*New Hampshire, Milford. Work will soon be completed with changes at the Middlesex Linen Co.'s mills and the entire plant will soon be in operation.

New Jersey, Beverly. The liabilities of Turner Birkhead, hosiery manufacturer of this place, are estimated at $47,714. The mechanics' National Bank (Burlington) is principal creditor.

New Jersey, Camden. The Camden Wool Stock Company, operating 4 cards, 1 garnett, 5 pickers and 2 carbonizers on wool stock, with a capital of $50,000, Thomas Lee, president, and Harry Gerhard, treasurer, have dismantled the plant and reports out of business. The building is now for rent. They were located at 2d and Erie Sts.

*New Jersey, Camden. The Stokes & Taylor Co. recently reported as having taken over the business of Harry Z. Taylor, formerly located in Philadelphia, and removing their business to the S. W. Cor. of 3rd and Federal streets, are now installing their machinery. The plant will contain 15 braiders, to be run on shoe and corset laces, and 8 looms for weaving tapes, bindings and narrow fabrics. Two looms are already set up and part of the braiding machinery in operation. Mr. Stokes, Mr. Taylor's new partner, was formerly connected with the late Hub Gore Co., formerly located in this town, and has charge of the selling end of the business, while Mr. Taylor does the managing and buying. They have many orders on hand. The plant is run by electricity.

Personals.

J. P. Carter has resigned as overseer of weaving for the Inman Cotton Mills, Inman, S. C., and accepted a similar position with the Anderson Cotton Mills, Anderson, S. C.

T. C. Coble has been appointed superintendent of the Oneida Cotton Mills, Graham, S. C. He formerly held the position as boss weaver at this mill.

B. W. Brigham, overseer of spinning at the Alpine Mills, Morgantown, N. C., has resigned and accepted a position with the Arlington Mills, Gastonia, N. C.

J. B. Huggins, overseer at the Florence Cotton Mills, N. C., has resigned.

Thos. Danahey has accepted a position as loom fixer at the Saranac Mills, Blackstone, Mass.

Wm. H. Berwood has again re-entered the employ of the Madison Woolen Mills, Madison, Me., as overseer of spinning.

C. H. Greenwood has been appointed superintendent of the Mayflower Mills, which are soon to begin operation at North Adams, Mass.

Paul A. Schwartz has accepted a position as designer for A. L. Sayles & Sons mill at Pascoag, R. I.

R. H. Cushing, formerly superintendent at the Sheridan Woolen Mills, Ashuelot, N. H., has resigned and accepted a position at the Geneva Worsted Mills, Providence, R. I., a position made vacant by Mr. O'Keefe.

Geo. W. Shepard, overseer of the frame spinning for the Wauregan Company, Killingly, Conn., has severed his connections with that company after 41 years of continuous service.

Geo. H. O'Leary has been elected president of the Clover Cotton Mfg. Co. to succeed Geo. L. Riddle.

Geo. Smith has resigned as overseer of spinning for the Plainfield Woolen Co., Central Village, Conn. He was formerly employed at Peacedale, R. I. Geo. Smithers fills the vacancy made by Mr. Smith's retiring.

Chas. Lawrence, overseer of the mule room at the Dartmouth Mills, New Bedford, Mass., has severed his connection with that company and accepted a similar position with the Hills Grove Mills, Hills Grove, R. I.

W. B. Gardner, bookkeeper at the Soule Mills, New Bedford, Mass., has been appointed superintendent of a department in the Arlington Mills, Lawrence, Mass.

George Bury has accepted a position as superintendent in a mill in Philadelphia, Pa. He was formerly employed at the Glen Worsted Mills, Harrisville, R. I.

Charles R. Danielson has withdrawn his resignation with the Cotton Yarn Co., New Bedford, Mass., and will continue as General Superintendent of the Sanford Department New England Cotton Yarn Co.

M. S. Witherell has accepted a position as overseer of weaving for Hall, Lincoln & Co. in the Chase Mills, Moodus, Conn.

John Dwyer, overseer of weaving at J. J. Regan Mfg. Co. Mill, Rockville, Conn. has resigned and accepted a similar one with the Vernon Woolen Co., Vernon, Conn.

Chas. L. Griffiths has accepted a position as boss carder for the Lethbridge Woolen Co., Ltd., Lethbridge, Alta., Canada. He was formerly employed at the Oneko Mills, New Bedford, Mass.

M. H. McEvoy has accepted the position as boss dyer for the Somerset Mfg. Co., Raritan, N. J. He was formerly employed at the Daniels Worsted Mill, Worcester, Mass.

A. L. Cochrane has accepted a position as designer for the Knoxville Woolen Mills, Knoxville, Tenn.

Albert Ainley has accepted a position as overseer of weaving and dressing for the McGee Mfg. Co., Greenville, S. C. He was formerly employed at Providence, R. I.

Walter H. Eyers has accepted a position as overseer of finishing for the Pioneer Woolen Mills, Pittsfield, Me. He was formerly employed at the Merrimack Woolen Co., Lowell, Mass.

Benjamin Eyers, overseer of the finishing department for the Pioneer Mills, Pittsfield, Me., has resigned and accepted a position at the Talbot Mills, North Billerica, Mass.

Orrin Clark has resigned as assistant designer for the Taconic Mill, Pittsfield, Mass.

Benjamin Brierly, overseer of the printing department for the Cocheco Print Works, Dover, N. H., has resigned.

Thomas Brennan has accepted a position at the Elizabeth Mills, Hills Grove, R. I., as second hand in the spinning department. He was formerly employed at New Bedford, Mass.

William A. Davis, second hand in the spinning department of the Elizabeth Mills, Hills Grove, R. I., has resigned and accepted a position as overseer at Danielson, Conn.

Aleck McGibbon has accepted the position as master mechanic for the Saugus Mfg. Company, Saugus, Mass. He was formerly employed at Lawrence, Mass.

John J. O'Connor, overseer of spinning at the Saugus Mfg. Company, Saugus, Mass., has resigned and is succeeded by Herbert Palmer of Lewiston, Me.

C. N. Taylor has accepted a position as overseer of dyeing for the Brogon Mills, Anderson, S. C., having recently resigned a similar one with the Falls Co., Norwich, Conn.

Geo. Newry has accepted the position as overseer of dyeing for the Monarch Woolen Company, Montville, Conn. He was formerly employed at East Glastonbury, Conn.

B. L. Harney, overseer of weaving for the Bound Brook Woolen Mills, Bound Brook, N. J. has severed his connection with that company.

Frederick Heine has accepted a position as overseer of weaving at the Bound Brook Woolen Mills, Bound Brook, N. J. He was formerly employed at the Beaver Brook Mills, Collinsville, Mass.

Mark B. Creed who has held the position as superintendent of the No. 1, 2 and 3 Wamsutta Mills, New Bedford, Mass., has been transferred to superintendent of the No. 4 and 5 Wamsutta Mills, a more responsible position.

James H. Jones, overseer of the mule spinning department at the No. 6 Wamsutta Mill, New Bedford, Mass., has been promoted to the position as superintendent of the No. 1, 2 and 3 Wamsutta Mills. The position made vacant by Mr. Jones promotion has been filled by Benjamin Herford.

William J. Rollinson has resigned the position as overseer of finishing for the Pawcatuck Woolen Mills, Potter Hill, R. I.

Walter Oldham, overseer of finishing for the Terry Mfg. Company, Waterville, Me., has resigned.

Walter Whitefield, overseer of weaving at the Terry Mfg. Company, Waterville, Me., has resigned.

Fred Taylor, has accepted the position as overseer of ring spinning for the Louisville Cotton Mills, Louisville, Ky.

Frank Judson has accepted a position as wet finisher for the Merrimack Woolen Mills, Dracut, Mass., he was formerly employed at the Jefferson Mfg. Company, Jefferson, Mass.

Patrick F. Doyle has accepted a position as overseer of finishing for the Allentown Woolen Company, of Allentown, R. I. He was formerly employed at the Brigham Woolen Company at Danielson, Conn.

Henry R. Brown has accepted a position as superintendent of the Phoenix & Hope Mills of Hope, R. I., succeeding the late Richard G. Howland.

James R. Garnett has accepted a position as overseer of finishing at the Gonic Mfg. Company, Gonic, N. H., he was formerly employed at Bridgton, Me.

Ernest Nelson has accepted the position as loom fixer at Goffs Falls, N. H. He was formerly employed at E. Rochester, N. H.

Daniel J. Sullivan has been appointed overseer of mule spinning at the No. 6 Wamsutta Mill, New Bedford, Mass. He formerly held the position as second-hand.

Haines Helliwell has accepted the position as overseer of the dyeing department for the Stafford Worsted Co., Stafford Springs, Conn. He was formerly employed at Providence, R. I.

Chas. S. Garner has accepted the position as overseer of weaving for the Mayo Woolen Mills, Millbury, Mass., he was formerly employed at Jefferson, Mass.

Chas. F. McGill has accepted the position as overseer of finishing at the Pontecherry Mills, Bridgton, Me. He was formerly employed at Kezar Falls, Me.

Frank E. Page, who was recently appointed Lawrence, Mass., has resigned and accepted an appointment as assistant wool buyer at the Wood Worsted Mills of the same city.

Ralph Ingram, son of agent Jas. Ingram of the Washington Mills, Lawrence, Mass., has been appointed superintendent of the Prospect Mills to succeed Mr. Page.

Joseph A. Daly has accepted the position as overseer of carding for the Pawcatuck Woolen Mills, Potter Hill, R. I., succeeding Frank Peck, resigned.

Charles O. Dexter, superintendent for the Canadian Colored Cotton Mills Co., Ltd., Hamilton, Ont., Canada, has severed his connection with that company.

G. W. Edwards has accepted a position as overseer of spinning at Kingsville (Ontario), Woolen Mills. He was formerly employed at Markham, Ont.

D. A. Holdscaw has accepted a position as superintendent of the Mount Holly Cotton Mills, Mount Holly, N. C. He succeeds J. F. Downum.

C. H. Hailey has accepted a position as superintendent of the Continental Mills at Charlotte, N. C. He was formerly employed at the Kesler Cotton Mills, Salisbury, N. C.

O. L. Smith has resigned his position as overseer of carding for the Roanoke Mills Co., Roanoke Rapids, N. C. He is to take a position as superintendent of the Weldon Cotton Mills.

Alec Linton has accepted a position as overseer of dyeing at Louisville, Ky. He was formerly employed at O'Brien Bros. Woolen Mill, Douglas, Ireland.

John Heys has taken a position as overseer of spooling for the Indian Orchard Co., Indian Orchard, Mass. He held position as overseer of the Buff Department for the Williamsville Mfg. Co., Williamsville, Conn.

Wesley Crouse has accepted a position as overseer of spinning at the Mount Holly (N. C.) Cotton Mills.

A. W. Roper has accepted a position as overseer of carding at the Mount Holly (N. C.) Cotton Mills.

E. N. Taft has been promoted from overseer to superintendent, nights, for the Monroe Cotton Mills, Monroe, N. C.

Robert Cherry has resigned his position as overseer of spinning for the Albion Mills, Mt. Holly, N. C. Position has been filled by Thomas E. McCarnes from Belmont, N. C.

John T. Rountree has resigned his position as overseer of spinning at the Golden Belt Mfg. Co., Durham, N. C., and accepted the position which he held some time ago with Barker Cotton Mills, Mobile, Ala. The position made vacant has been filled by W. C. Spencer of Spray, N. C.

James Murphy has accepted the position as overseer of carding nights for H. T. Murdock & Co., of Proctorsville, Vt. He was formerly employed at Lawrence, Mass.

S. S. Strong has accepted a position as constructing engineer for the new West Point Cotton Mills, No. 2, West Point, Ga.

J. W. Campbell has accepted a position as second hand in the carding department of the J. R. Montgomery Co., Windsor Locks, Conn. He was formerly employed at Utica, N. Y.

Charles Kennedy has accepted a position as second hand in the spinning department of the Lawton Cotton Mills, Corp., Plainfield, Conn.

Peter McConnell, assistant foreman in the bleach house at the Apponaug Co., Apponaug, R. I., has accepted a position as overseer of bleaching at the Saylesville Bleachery, Saylesville, R. I.

Wm. N. Clark, overseer of weaving department at the Bigelow Carpet Co., Clinton, Mass., has accepted a position with M. J. Whittall, Worcester, Mas..

W. C. Hall has accepted a position as assistant superintendent with Hind & Harrison Plush Co., Clark Falls, N. Y. He was formerly employed at Belmont, N. H.

Ernest Steinberg has accepted a position as superintendent of the Worumbo Woolen Mills, Lisbon Falls, Me. He was formerly employed at Baltimore, Md.

Fred Thrope, overseer of finishing at the Allenton Woolen Co., has accepted a position at the Yantic Woolen Co., Yantic, Conn.

John Hirst has accepted a position as overseer of finishing for the Rochester Woolen Mills, Rochester, N. Y. He was formerly employed at Saxonville, Mass.

E. W. Mercer has accepted a position as overseer of carding for the Beaver Dam Woolen Mills, Beaver Dam, Wis. He was formerly employed at Peru, Ind.

Fred A. Cushing has accepted a position as designer for his father, Henry R. Cushing, who is superintendent of the Geneva Mills, Wainskuck Co., Providence, R. I.

Wm. B. Gardner has been appointed superintendent of one of the Arlington Worsted Mills, Lawrence, Mass. He was formerly employed at New Bedford and was connected with the Soule Mills in that city for a number of years.

James Boland has accepted a position as superintendent of the Hudson Converting Mill Co., Hudson, Mass., a new company recently formed for the manufacture of yarns. He was for 25 years connected with the Lancaster Mills, Clinton, Mass.

Wm. McKnight, recently appointed assistant superintendent for the Barnaby Corp., Fall River, Mass., has severed his connection with that company.

Clarence A. Brown, for many years superintendent of the Conanicut Mills and recently director, has been elected treasurer to fill the vacancy caused by the death of Crawford E. Lindsay.

John J. O'Connor has accepted a position as superintendent of the McCarthy Yarn Mills, Cohoes, N. Y., a position made vacant by the resignation of Mr. Taylor. Mr. O'Connor comes from Providence, R. I.

Ralph J. Sheridan has accepted a position as superintendent of the Sheridan Woolen Mills, Ashuelot, N. H., taking the position made vacant by his father.

Walter Whitfield has accepted the position as overseer of weaving for the J. J. Regan Mfg. Co., Rockville, Conn. He was formerly employed at the Terry Mfg. Co., Waterville, Me.

Charles Francis Sawyer, for several years agent of the Sawyer Woolen Mills, Dover, N. H., and owned by the American Woolen Company, has severed his connection with that company. His successor will be A. B. Paton, who some time ago started and operated the Central Woolen Mills at Stafford Springs, Conn. Mr. Paton was formerly engaged for a number of years for the Geo. H. Gilbert Mfg. Company, Ware, Mass.

E. H. Coburn of Biddeford, Me., has been appointed agent of the Stark Mills, Manchester, N. H. He was formerly employed at West Point, Ga.

Jos. White was appointed by Mayor McMahan of Fitchburg, Mass., to the position as public weigher at the Fitchburg Yarn Company's Mill.

John Sharp, overseer of spinning for the British Hosiery Company, Thornton, R. I., has severed his connection with that company after fifteen years of service.

Dennis Noonan has accepted the position as superintendent of Amos Abbot & Co., Dexter, Me., R. A. Latimer, resigned. Mr. Latimer will give his entire attention to the supervision of the Terry Mfg. Co., Waterville, Me.

Frank L. Almy has been elected president and John F. Stafford, vice president of the Flint Mills at a meeting recently held by the directors. Mr. Almy is to fill the place of the late John D. Flint.

Thomas McCormick has accepted a position as overseer of spinning at Drayton, N. C. He was formerly employed at the Kent Mfg. Company, Centreville, R. I.

Jos. S. Gray, foreman of the bleach house at the Lonsdale Bleachery & Dye Works, recently had a paralytic shock and his right side was completely paralyzed. He was taken to his home at Prospect Hill. He is a prominent citizen of Lonsdale and his many friends are deeply concerned on account of his sudden illness.

Wm. Welch, bookkeeper for Frederick Faulkner's Mill at Stafford Springs, Conn., has taken an interest in the Somerset Woolen Mills, Monson, Mass., and will act as treasurer. The position as bookkeeper at the Faulkner Mills, which Mr. Welch resigned, has been filled by Ernest Boyce, who was formerly employed in that town.

Leonard Junier has accepted a position in the carding department for S. Slater & Sons, Webster,

Mass. He was formerly employed at Fall River, Mass.

Wm. B. Isaac, overseer of spinning at the Columbiaville Woolen Mills, Columbiaville, Mich., has resigned.

A. J. Pero, overseer of weaving at the Manchester Woolen Company, Manchester, Montana, has severed his connection with that company.

Thomas Whitely has accepted a position as superintendent of the Somerset Worsted Mills, of East Madison, Me.

Roscoe N. Stokes has accepted a position as assistant designer for the Cleveland Worsted Co., Cleveland, Ohio.

T. A. Tunney has severed his connection with Joseph Noone's Sons Co., Peterboro, N. H., as overseer of carding and returned to his home in Turner, Me.

William Nelson, who has been head instructor in the weaving department of the Lowell Textile School since that school was opened, has accepted the position as superintendent of the Neuse River Cotton Mill, Falls, N. C. Mr. Nelson has been in the South during the summer working in the mill and at the conclusion of his work was offered the position and accepted it. He will begin work in North Carolina at the beginning of October.

Barney Clouso is now in charge of carding for the Wyoming Yarn Co., Wyoming, R. I.

James Perkins has accepted the position as superintendent and designer for the Royal Worsted Mills, Harrisville, R. I. He was formerly employed in large mills in England.

Dyson Crowther, superintendent of the Royal Worsted Mills, Harrisville, R. I., has severed his connection with that company and accepted a similar position at Pittsfield, Mass. The employes at the Royal Mills presented Mr. Crowther with a writing desk and chair and Harry L. Cabana made the presentation speech.

L. E. Davis, who has held the position as overseer at the Androscoggin Mills, Lewiston, Me., has been obliged to give up his position on account of ill health.

J. W. Bolton has been appointed general superintendent of the Cleveland Worsted Mills Company, Cleveland, Ohio. Mr. Bolton formerly held the position as superintendent of the worsted yarn department.

John T. Eyers has accepted the position as overseer of fulling for the Bound Brook Woolen Mills, Bound Brook, N. J. He was formerly employed at the Somersville Mfg. Company, Somersville, Conn.

Cornelius Murphy has accepted the position as overseer of gigging for the Bound Brook Woolen Mills, Bound Brook, N. J. He was formerly employed at the Madison Woolen Mills, Madison, Me.

F. Pohlman has been appointed overseer of dyeing for the Middlesex Company, Lowell, Mass. He was formerly employed at the Haile & Frost Mfg. Companyy, Hinsdale. N. H.

L. N. Durette has accepted the position as overseer of weaving for the Terry Mfg. Company, Waterville, Me.

James Garnett, formerly employed at East Rochester, N. H., has accepted the position as overseer of finishing for the Gonic Mills, Gonic, N. H.

John Owens, overser of carding for the Grant Yarn Company, Fitchburg, Mass., has severed his connection with that company. He has been succeeded by Peter Sprowson.

Wm. H. Haw, a member of the firm of Sykes & Street, chemical manufacturers of Boston and New York, died in Philadelphia at the age of 58 years.

John M. David has accepted the position as overseer of weaving for the People's Cotton Factory at Montgomery, Ala. He was formerly employed at Pelham, Ga.

Arthur Butterworth has accepted the position as overseer of finishing and dyeing for the Lethbridge Woolen Mills, Lethbridge, Alta, Canada.

F. A. Owen has accepted the position as overseer of dyeing for the South Bend Woolen Mills, South Bend, Ind. He was formerly employed at Brooklyn, N. Y.

Thos. W. Harvey, superintendent of the Charlotte Cotton Mills of Charlotte, N. C., but more recently superintendent of the Manchester Mills at Macon, Ga., has been selected for the position as superintendent of the Plattville Cotton Mills, Plattville, Ala.

James L. Holt, superintendent of the Fidelity Mills of Charlotte, N. C., is now superintendent at the Mt. Airy Cotton Mills, Mt. Airy, N. C.

R. H. Stroud has accepted a position as overseer of carding at the Dilling Cotton Mills. He was formerly employed at Hamer, S. C., Cotton Mills.

M. B. Cloninger has accepted a position as overseer of spinning in the new mill at Bessemer City, N. C., he was formerly employed at the Arlington Cotton Mills, Gastonia, N. C.

C. M. Garris has accepted the position as overseer of spinning and winding at the Mt. Airy Cotton Mills, Mt. Airy, N. C.

G. W. Ward has resigned his position as overseer of spinning at the Delgado Mills, Wilmington, N. C. H. C. Mason has been promoted to the position of carder and spinner at this same mill.

E. E. Bowen, overseer of carding at the Manetta Mills, Lando, N. C., has resigned his position.

C. E. Sweet, who has held the position as assistant superintendent for the Uncasville Mfg. Company, Uncasville, Conn., has been appointed superintendent to fill the position made vacant by the resignation of Mr. McMeehan.

DEATHS.

Col. Wm. Goddard, one of Rhode Island's leading cotton manufacturers, died at his home in Providence, R. I., September 21st. Death was caused by the bursting of a blood vessel in his leg

about a year ago, which has troubled him ever since. He was 82 years of age and was a member of the firm of Goddard Bros., cotton manufacturers with mills at different towns in Rhode Island. He was born at Warwick, R. I., December 25, 1825, and after graduating from Brown University he studied law and traveled extensively returning to engage in the cotton business. He was chancellor of Brown University and one of the wealthiest and best known men in the State. He was also president of the Providence National Bank for thirty-five years.

Oliver H. Moulton, for forty years agent of the Hamilton Mfg. Company, Lowell, Mass., died at his home in that city after an illness of three weeks. He was born in Dover, N. H., October 31, 1829, and educated in the public schools of Saco. He learnt the cotton manufacturing business at the York Mills, Biddeford, Me., and afterwards assisted in the establishment of the Pepperell Mills. In 1854 he moved to Lawrence and was overseer there for five years. He afterwards was appointed superintendent of the Amoskeag Mfg. Company, Manchester, N. H., and later came to Lowell, where he remained until his death.

George Smith died at his residence in Chester, Pa., after an illness of two years. He had undergone treatment in the hospital. Mr. Smith with his father operated the old Pioneer Mills which were in operation in that city before the Civil War.

John Thompson, a former alderman and for several years overseer of weaving for the Dwight Mfg. Co., Chicopee, Mass., died August 15th at his home in that town after an illness of eight months. He was born in England about 50 years ago.

S. M. Peterson has accepted a position with the Alpine Knitting Mills, Pittstown, Pa. He has had charge of the Josephine Mills, Cedartown, Ga., for the past year.

Richard G. Howland, superintendent of the Hope Company, Hope, R. I., and one of the foremost citizens of that town, died August 20th at the summer home of his son at Saranac Lake, N. Y., where he had spent a brief vacation. He was born in Centreville, R. I., September, 1840, and was employed for a short time at the Riverpoint Mills and in July, 1868, went to the Hope Mills as assistant to the agent. He was active in business circles, holding the office as president of the Pawtuxet Valley Railroad Company and president of the Phoenix Trust Company and also a director of the Hope Webbing Company.

William H. Porter for a number of years superintendent of the Hebron Mills, Hebronville, Mass., and who has been in the brokerage business for a number of years at Pawtucket, R. I., died at his residence 223 Cottage St. in that city at the age of 70 years.

Monroe B. Bryant who for a number of years manufactured woolen cloth in the old woolen mill at Greylock, North Adams, Mass., a number of years ago, died at his home in Chesterfield.

Frederick A. Sykes, treasurer of the Agawam Company, Agawam, Mass., a prominent woolen manufacturer died at that place.

John B. Flint, a prominent Fall River business man and cotton manufacturer, died at his home in that city August 28th. During the past few years, he had undergone many operations, the last one being performed two weeks ago and he failed to rally. He was president of the Flint Mills and was also interested in church affairs being a prominent Methodist. He was also a director of the National Union Bank.

C. A. Dockham, of C. A. Dockham & Company, Boston, died at his home, North Reading, Mass., at the age of seventy-two. He is said to be the oldest publisher in the United States. He was born in Methuen, Mass., and when only eighteen years old became publisher of a directory at Newburyport, Haverhill and Lawrence. Four years later, he went West and published the first business directory in Milwaukee. In 1860, he returned to Lawrence and started the Lawrence Daily Journal, which he conducted for six years, during the period of the Civil War. In 1866, he began the publication of Dockham's Textile Directory of Manufacturers and Dry Goods Trade which has been published in alternate years ever since. So far as we are aware, this was the first publication devoted to textile interests, antedating the establishment of the Industrial Record, now the Textile World Record, by two years. Mr. Dockham is survived by a widow, one son and two daughters. The son, Stevens Dockham, had the management of the business for several years.

Ex-mayor Marciene H. Whitcomb of Holyoke, Mass., died at his home 161 Walnut St., Sept. 11th. He was born in Reading, Vt., Oct. 23, 1837, and moved to Holyoke in 1875, where he took the position as superintendent of the Springfield Blanket Co. He also held the position as superintendent of the mill at Otter River, Mass. He was elected mayor in 1894, serving one term.

Luther J. Warner, aged 56 years, of Green St., North Hampton, Mass., died at his home September 15th after an illness of several weeks. He was formerly one of the proprietors of a large silk mill which did business on the Bay State Lawrence road. The business was established by his father, Jos. Warner, in 1838.

Thos. Greenwood of Kidderminster, England, an inventor of carpet looms, and also a designer, died at his home in that town recently.

John T. McDavitt, superintendent of the Clark Thread Company, Newark, N. J., died in that city at the age of 59 years.

Michael Schwartz, employed as boss dyer at the Franklin Mills, Franklin, N. H., died at his home in Hartland, Me. He has been employed for the Franklin Mills for a number of years and was a member of the Geo. F. Sweatt Post, No. 38, G. A. Mfg. Company, Hinsdale, N. H.

John A. Fant, president and treasurer of the Monarch Cotton Mills, Union, S. C., died suddenly at his home in that city September 24th. Up to the time of his death, he was apparently in good health. He was one of the best mill men in the State and was largely interested in mercantile, educational and religious affairs. He was 49 years of age, and leaves a wife and four children.

Sherman T. Stiles, a prominent manufacturer of Woonsocket, R. I., as the result of taking an overdose of morphine, died at his home in Providence, R. I. Mr. Stiles was 43 years of age and was known as an inventor of mill machinery.

New Publications.

[Any work noticed under this head can be obtained through the office of this journal.]

The Art of Cutting Metals; by Frederick W. Taylor, M. E.; The American Society of Mechanical Engineers, New York. Price $3.00.

This is a reprint of the address of Frederick W. Taylor, president of the American Society of Mechanical Engineers, given at the last annual meeting of the society. The demand for this work has been so great as to warrant its publication in book form.

Canadian Textile Directory and Pulp and Paper Handbook; Biggar-Wilson, Ltd., Toronto, Canada. Price $3.00.

This is a volume of 525 pages forming a very well arranged directory of the Canadian textile, pulp and paper industries. The firms are classified not only by localities, but also by the different branches of the industry so that the reader can make ready reference to the individual firm as well as to the companies in any particular locality, or to those manufacturing any special class of goods. The details given for each concern include the names of the officers, size of the mill, kind of power used, when established, class of goods made, and selling agents. In addition to the list of mills there are classified lists of dealers in raw materials, yarn and finished goods.

The book also contains much other useful information, including the Canadian and Newfoundland customs tariff, list of the Canadian boards of trade and other trade associations. The directory of the paper and pulp manufacturers is compiled on the same lines, the whole forming a very useful handbook of these Canadian industries and incidentally affording evidence of the great development they have reached.

The Law of Trade Unions; by T. Seton Jevons, B. A.; Effingham Wilson, London, England. Price 75 cents.

The author of this book, who is an English barrister-at-law and a member of the New York State bar, has prepared this handbook for the purpose of placing before trade unions and workmen generally the chief features of the English law relating to trade unions. It is in England that trade unions have reached their highest development and for this reason a handbook of the English law relating to the unions will prove of great value to American students of the relations between employers and employes. The contents of the book are well arranged, enabling easy reference to any subject.

Technology of Finishing (Die Technologie der Appretur); by Dr. A. Ganswindt; 319 pages, 6 1/2 by 9 1/2; A. Hartleben's Verlag, Wien, Austria. Price $3.50.

This is a welcome addition to the not too numerous books on finishing textiles. The first part of it is devoted to mechanical processes and treats of the finishing of silk, cotton and woolen yarn and fabrics. There is a very complete section on woolen goods classified according to the different processes as well as according to the different kinds of goods. Then comes a section on the finishing of mixed goods, which is followed by another on the finishing of cotton goods. The second part of the book is devoted to the chemical processes. Here we find chapters on the finishing, weighting and waterproofing of silk, cotton and woolen goods and an account of the various processes for making goods fireproof and preventing the formation of mildew. The final chapters treat of finishing analysis and the purification of waste liquor from finishing works. The text is in German.

Business Literature.

Goulds Pumps; The Goulds Mfg. Co., Seneca Falls, N. Y.

A 48-page booklet, handsomely printed in two colors on heavy calendered paper, describing the Goulds triplex power pumps, and giving much valuable information regarding their application to the requirements of public buildings, pumping stations, factories, etc. The text is illustrated with many half tone engravings of the various styles of pumps and the buildings in which they have been installed. A copy may be obtained on application to the manufacturers.

Water Purification for all Purposes; Wm. B. Scaife & Sons Co., Pittsburg, Pa.

A catalogue of 96 pages which not only calls attention to the Scaife system of purifying water, but contains so much general information on the subject as to make a text-book on water softening. It contains many excellent illustrations.

Ferrofix and Its Uses; Ferrofix Brazing Co., 1003 Arcade Building, Philadelphia, Pa.

This catalogue gives an account of the Ferrofix process for brazing metals, which has been found of great value in mill repair work. The catalogue contains numerous illustrations not only of the Ferrofix process, but of many machine parts repaired by this method. There is also a partial list of the users of the Ferrofix process, to whom reference is made.

Protect Machinery from Rust.

When a plant closes down, say for repairs, it is very necessary that the bright parts of the looms and other machinery be protected against rust.

To meet the needs of textile mills a rust preventive must be always ready for instant use, easy to apply, removable without scraping or sand-papering, and must come off without leaving any stickiness or tarnish on the metal.

"Anti-Rust" has all these merits and more. It is not a new thing, but has been used for more than ten years by large builders of textile and other machinery. The Mason Machine Works, Taunton, Mass., say, "We have used your 'Anti-Rust' for a number of years, and always with unqualified success."

Any number of slushes and compounds may be used, but "Anti-Rust," made only by F. L. Melville, 192 Front St., New York, is in a class by itself.

It is put up in 10 and 25 pound cans and shipped f. o. b. New York.

Purifying Water

Wm. B. Scaife & Sons Co.'s methods and apparatus for purifying water supplies enable steam users to make a decided saving in the cost of operating their boilers. They have been making a large number of installations of Scaife and We-Fu-Go softening and purifying systems.

Among the sales reported by them are: Rochester & Pittsburgh Coal & Iron Co., Punxsutawney, Pa., 2,250 h. p. We-Fu-Go system (third order). Shenango Furnace Co., Sharpsville, Pa., 8,000 h. p. We-Fu-Go, system. Armstrong Cork Co., Oakdale, Pa., 500 h. p. We-Fu-Go system. Fostoria Glass Co., Moundsville, W. Va., 350 h. p. We-Fu-Go system. The Allen & Wheeler Co., Troy, Ohio, 200 h. p. We-Fu-Go system. Stone & Webster Engineering Corporation, Boston, Mass., 2,500 h. p. We-Fu-Go system for Jacksonville Electric Co., Jacksonville, Fla. The Paterson Parchment Paper Co., Passaic, N. J., 150,000 gallon per hour We-Fu-Go system. The American Steel & Wire Co., for the Newburgh Steel Works, Cleveland, Ohio, 25,000 h. p. We-Fu-Go system (second order).

Textile Graduates.

Following is a list of the graduates from the textile department of the International Correspondence School, New Bedford, Mass.:

Cotton Carding and Spinning Course.—Robert M. Watson, Gloucester City, N. J.; Ivan King, Anderson, S. C.; C. B. Van Nest, New York, N. Y.; Auguste Gagnon, Lewiston, Me.; John W. Woodward, North Adams, Mass.; James G. Borthwick, Lewiston, Me.; William J. Lewis, Augusta, Ga.; C. H. Scott, Greensboro, N. C.

Cotton Spinning and Warp Preparation Course.—John Delaney, Manville, R. I.

Cotton Warp Preparation and Plain Weaving.—Jerry Bergeron, Salem, Mass.

Fancy Cotton Weaving.—Charles E. Gillett, Housatonic, Mass.; Thomas Bickerstaffe, Baltic, Conn.

Woolen and Worsted Designing Course.—Roy Eastwood, Utica, N. Y.; James P. Devlin, Olneyville, Providence, R. I.

Woolen Carding and Spinning Course.—Joseph Ricard, Holvoke, Mass.

Woolen Warp Preparation and Weaving Course.—John Kelly, Scranton, Pa.; Frank E. Smith, Cleveland, Ohio.

Complete Woolen.—Walter R. Reed, Reynoldsville, Pa.

Unique Advertising Novelty.

The Minnich Machine Works, of Landisville, Pa., builders of the Minnich baling press, have issued a very attractive advertising novelty in the form of an aluminum hanger. It is as thin as a sheet of cardboard, and its burnished surface takes printing as readily as the former. The illustrations come out sharp and clear and show the baling press ready to receive the loose stock, and also a view of the press with the bale completed and ready to take out.

Tuscan Softener.

That the Tuscan softener, manufactured by Harding & Fancourt, 235 N. Front St., Philadelphia, Pa., is meeting with increased sales, due to the merit of the article, is shown by the many testimonials and duplicate orders they are receiving.

It is claimed that for fast black dyeing, Tuscan softener imparts to the finished product a brilliant luster and a soft, pliable finish at a reduced cost, and that it is unnecessary to use any soap or other softening oils when this softener is used.

To those desiring to test its merits, the manufacturers will send a five-pound sample free of cost.

A Seamless Fibre Can.

The officers of the Standard Fibre Company of Somerville, Mass., recently incorporated, are James W. Brock, president, and Harry E. Hansen, treasurer and secretary. The company, besides making fibre tubes for electrical work, are also making a seamless fibre roving can for the textile trade. This can is a patented article, and is claimed to be the first fibre can to be made without rivets by machinery. A few cans have been made by hand in this way, but this can is produced at a cost approximating that of an ordinary riveted can.

The Standard Fibre Company before incorporating was run for some years as an individual enterprise, and the seamless can which has been called "No Waste" has been sold very widely in various parts of the country The process of construction is to make a fibre tube ready for top and bottom, instead of the old style can which is made of fibre sheets which are then cut to size and riveted.

The advantages claimed for the "No Waste" can are that there is no seam to spread apart after the can has been used, and no imperfect places to catch the sliver and thereby waste the stock. The company has sold to many of the largest mills in the country and received already many duplicate orders.

Tested and Guaranteed Paints.

Painting is an item of expense in mill work which is looked upon usually as a necessary evil, and the average mill man considers that paint is paint. As a matter of fact, a good deal of what is sold as paint is hardly paint at all, at least not good paint.

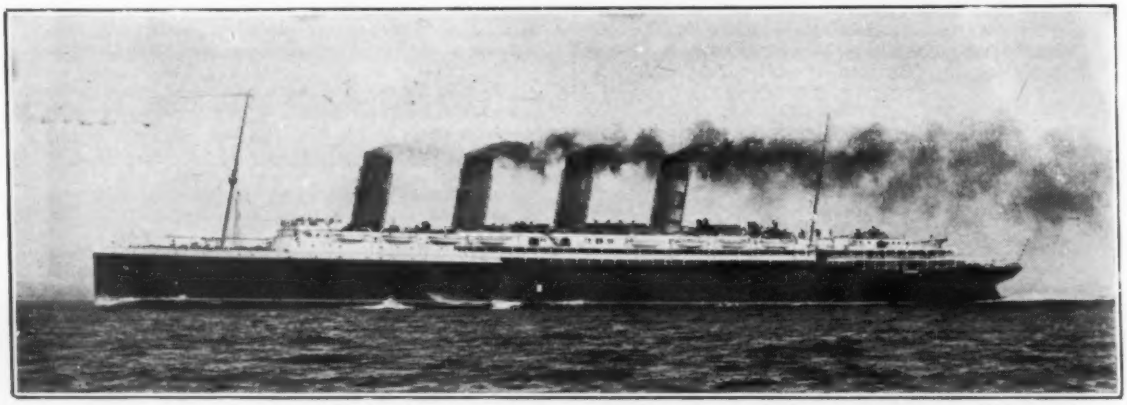
Good paint should have as a basis pure white lead, good linseed oil, with other ingredients to give it color and drying qualities. The opportunities for adulteration of paints are so great that many large users of paints are buying it subject to analysis and test, and responsible paint manufacturers are welcoming such trials.

The Chas. H. Brown Paint Co., 280 Baltic St., Brooklyn, N. Y., are among those who encourage this test on the part of prospective paint purchasers. Their "Statesman Ready Mixed Paint" is not only guaranteed, but bears on the label the analysis of purity by a prominent New York City chemist, certified to contain only pure linseed oil, pure carbonate of lead, pure oxide of zinc, pure tinting colors and drier. The company offer to send, free of charge, sample of their products.

The Lusitania.

The recent record-breaking trip of the Cunard liner, Lusitania, holds more than ordinary interest for textile men for not only does it mark the successful testing of the turbine principle in steam engines, but because a number of European delegates to the Second International Cotton Conference, to be held in Atlanta, October 7, 8 and 9, were on board. The Textile World Record hopes the memorable trip across will not prove the only pleasant and profitable feature of their visit.

Regarding the Lusitania it might be said that she embodies the highest type of marine architecture; with a length of 790 feet, breadth 88 feet, displacement 45,000 tons, estimated horse power of 70,000 developed by steam turbines, she is indeed the queen of the ocean. The Cunard line is to be complimented on her record of nearly 24 knots on the westward trip across the Atlantic.



On September 17 a reception was given on board the Lusitania by the Cunard Line to about 250 members of the press and invited guests. A. H. Tyler, of the Textile World Record's New York office, attended, and writes enthusiastically of the appointments of the new ship and the attention that has been paid to provisions for safe and comfortable transatlantic travel.

New Southern Agency.

Buyers of bale bands and buckles will be interested in knowing that the Acme Steel Goods Co. manufacturers of Acme supplies have opened a Southern sales and distributing branch at Atlanta, Ga., with headquarters in the Empire Building. In the opening of this Southern department, the company thus arranged for prompt deliveries to the mills about Atlanta, and perfect arrangements for satisfactory service to all parts of the country. The main office and works at Chicago, and the Eastern branch in New York City, now are supplemented by the new Southern branch in Atlanta.

The Textile Finishing Machinery Company of Providence, R. I., Give Their Third Annual Entertainment to Mill Men.

A handsomely engraved invitation, which was sent out by Harold J. Gross and Frederick I. Dana, respectively president and treasurer of the above company, requesting the pleasure of the recipient to meet them at Squantum, on Saturday, September the 21st, from 12 until 5 o'clock, was the cause of the assembling there of over one hundred and twenty-five representative mill men of the textile and paper trades, and the first thing that the guests did seemed to be to congratulate each other on being fortunate enough to be included in the party.

The Squantum Club is unique in having a reputation of its own, and a day spent there is one long to be remembered. On the arrival of the guests, they were received most graciously by Colonel Gross and Mr. Dana, who were assisted in receiving and caring for the comfort of the guests by E. A. Rusden, the general manager, Geo. R. Thurber, assistant treasurer, Geo. C. Phillips, and other gentlemen associated with the company. The entire absence of formality throughout the day, together with a most cordial hospitality shown, were responsible for the great success of the occasion. Colonel Gross and Mr. Dana were unanimously voted past masters at the art of entertaining.

Immediately on the arrival a most tempting luncheon was served.

LUNCHEON

Little Necks and Oysters in Shell
Lobster Salad Fish Balls
Lettuce and Butter Sandwiches
Lamb Kidneys au Madeira
Cheese Crackers Doughnuts
Dampeners

After a pleasant hour or two spent in circulating around the grounds, visiting the bowling alleys, billiard rooms, and mingling with friends, the party was escorted to the main dining room,

where Colonel Gross presided as toast master with dignity and grace.

DINNER

Small Melons
Clam Bouillon
Clam Chowder Clam Fritters
BAKE
Clams
Sweet Potatoes Green Corn
Frappe Tom and Jerry
Cigarettes
Blue Fish a la Italienne
Stuffed Green Peppers Potatoes Natural
Baked Lobsters Julienne Potatoes
Crab Meat Salad
Indian Pudding and Cream
Cream Cheese au Kummell
Toasted Crackers
Cafe Noir

Among the dignitaries who graced the head table on either side of the toast master were His Excellency the Governor of Rhode Island; His Honor Patrick J. McCarthy, Mayor of Providence; Hon. Adin B. Capron, representative to Congress; Hon. Chas. P. Bennett, Secretary of State of Rhode Island.

After full justice had been done to the extensive dinner menu, Colonel Gross expressed his pleasure and that of his associates in meeting those who had accepted their invitation, and then called on the honored guests present, whose names are mentioned above, who responded in a most able and entertaining manner.

The following is a list of the gentlemen present:

His Excellency, Governor of Rhode Island.
Hon. Patrick J. McCarthy, Mayor of Providence, R. I.
Hon. Adin B. Capron, Representative to Congress.
Hon. Chas. P. Bennett, Secretary of State of Rhode Island.
Col. Harold J. Gross, Pres. Textile Finishing Machinery Co., Providence, R. I.
Frederick I. Dana, Treas. Textile Finishing Machinery Co., Providence, R. I.
E. A. Rusden, Gen. Mgr. Textile Finishing Machinery Co., Providence, R. I.
John Foster, Providence, R. I.
Walter H. Stearns, Sec. and Treas. R. I. Card Board Co., Pawtucket, R. I.
Robert W. Linton, Mgr. Natl. Coated Paper Co., Pawtucket, R. I.
A. A. Fuller, Supt. Prov. Eng. Wks., Providence, R. I.
James Gee, Supt. Interlaken Mills, Providence, R. I.
Ferdinand H. Allen, Treas., Ashland, R. I.
A. H. Carsley, General Elec. Co., West Lynn, Mass.
John G. Massie, Pres. Squantum Assn., Providence, R. I.
A. Schaer, Agt. Warren Mfg. Co., Warren, R. I.
A. F. Hobbs, Res. Mgr. U. S. Fin. Co. (S. Spr.), Providence, R. I.
John D. Lloyd, Pres. Crown Dyeing Co., Medford, Mass.
Frank L. Nagle, Pres. Lord & Nagle Co., Boston, Mass.
F. B. Kenney, Mgr. T. C. Entwistle Co., Lowell, Mass.
B. M. Rockwood, Treas. Norfolk Woolen Co., Franklin, Mass.
Frank Hartley, Mgr. (Cambrics) S. Slater & Sons, Inc., Webster, Mass.
H. Linton, Treas. Pawt. Gl. Paper Co., Pawtucket, R. I.
Fred S. Crawford, Sec. Pawt. Gl. Paper Co., Pawtucket, R. I.
John W. Arrington, Pres. and Treas. Union Bich. & Fin. Co., Greenville, S. C.
Percy H. Brundage, New York City.
H. V. Ham, Asst. Res. Mgr. U. S. Fin. Co. (S. Spr.), Providence, R. I.
E. R. Bullock, Mec. Eng. J. & P. Coats Co., Pawtucket, R. I.
F. S. Hall, Pres. Barrowsville Bleachery, Barrowsville, Mass.
Harry M. Smith, Standard Mill Sply. Co., Providence, R. I.
F. E. Burbank, Gen. Mgr. Barrowsville Bichy., Barrowsville, Mass.
W. H. Heald, Asst. Treas. Crown Dyeing Co., Medford, Mass.
Wm. J. Stewart, S. Slater & Sons, Webster, Mass.
George Crompton, Somerville, Mass.
H. B. Clark, Pur. Agt. Amer. Loco. Auto. Co., Providence, R. I.
W. H. Walton, Providence, R. I.
Henry C. Dexter, Treas. Greene & Daniels Mfg., Pawtucket, R. I.
George C. Phillips, Providence, R. I.
Josiah W. Crooker, Providence, R. I.
Harris H. Bucklin, Asst. Treas. Interlaken Mills, Providence, R. I.
Thos. P. Himes, Treas. Narragansett Fin. Co., Providence, R. I.
R. J. Bowes, Mgr. Lawrence Felting Co., Millville, Mass.
Dwight Seabury, Mill Eng., Pawtucket, R. I.
Henry B. Faber, Sec. Doty & Scrimgeour, New York City.
Mr. Fisher, Russell Mfg. Co., Middletown, Conn.
C. Wheeler, Supt. Griffin Mfg. Co., Griffin, Ga.
George Arnold, Vice-Pres. Amer. Silk D. & F. Co., Paterson, N. J.
A. Tenney White, Supt. Manville Co., Manville, R. I.
Robert N. Gee, Asst. Supt. Interlaken Mills, Arkwright, R. I.
Allen H. Chase, Providence, R. I.
Dr. Fenner H. Peckham, Pres. Hope Webbing Co., Pawtucket, R. I.
Charles Sisson, Treas. Hope Webbing Co., Pawtucket, R. I.
Jefferson Borden, Jr., Vice-Pres. and Treas. Fall River Bichy., Fall River, Mass.
J. H. Wright, Pres. and Gen. Mgr. U. S. Fin. Co., New York City.
William R. Pollock, Pawtucket, R. I.
M. J. Bowes, Supt. Lawrence Felting Co., Millville, Mass.
J. W. Greene, Supt. Hamilton Web. Co., Hamilton, R. I.
Geo. F. Fowler, Pres. Hampden Gl. Paper & C. Co., Holyoke, Mass.
George Schlosser, Woonsocket Rubber Co., Woonsocket, R. I.
J. Henry Dallahan, Mgr. Soringdale F n Co., Canton, Mass.
S. H. Steel, Vice-Pres. J. H. Bragdon & Co., New York City.
Harry Wylde, Supt. (Ptg. Wks.) Pacific Mills, Lawrence, Mass.
E. E. Clark, Supt. Williamsville Mfg. Co., Killingly, Conn.
Francis W. Greene, Treas. S. H. Greene & Sons, Riverpoint, R. I.
M. A. Rawlinson, Agt. Chicopee Mfg. Co., Chicopee Falls, Mass.
Thomas K. Bates, S. Slater & Sons, Webster, Mass.
R. G. Rowley, Universal Winding Co., Providence, R. I.
A. E. Lloyd, Supt. Mechanical Fabric Co., Providence, R. I.
H. M. Peirce, Agt. Greenwich Bleachery, East Greenwich.
David Lowe, Supt. Parkhill Mfg. Co., Fitchburg, Mass.
J. A. Perry, Mgr. D. Goff & Sons, Pawtucket, R. I.
James H. Sanders, Treas. Southbridge Ptg. Co., Southbridge, Mass.
J. Milton Payne, Pawtucket, R. I.
Robert Reoch.
Samuel Smith, Textile Fin. Mchy. Co.
J. O'Brien, Textile Fin. Mchy. Co.
H. W. Honeyman, Supt. Factory A Textile Fin. Mchy. Co.
W. P. Thompson, Supt. Factory B Textile Fin. Mchy. Co.
S. H. Purkis, Gen. Supt. Textile Fin. Mchy. Co.
A. C. Freeman, Textile Fin. Mchy. Co.
C. F. Tillinghast, Textile Fin. Mchy. Co.
Geo. R. Thurber, Asst. Treas. Textile Fin. Mchy. Co.
Robert Butterworth, Supt. Reversible Collar Co., Cambridge, Mass.
Elwell R. Butterworth, Asst. Supt. Reversible Collar Co., Cambridge, Mass.
Harry M. Turner, Supt. Crystal Spg. Bchy., Fall River, Mass.
Geo. H. Merrick, Supt. Riverside Mills (Amer. Woolen).
J. M. Kendall, Amoskeag Mfg. Co., Manchester, N. H.
E. L. E. Drake, Mgr. Cassella Color Co., Providence, R. I.
W. A. Arnold, Pres. Amer. Silk D. & F. Co., Providence, R. I.
Chas. A. Rice, Myrick & Rice, New York City.
Mr. Godfrey, Pres. International Webbing Co., Providence, R. I.
Chas. T. Hoye, Supt. Nat. & Prov. Worsted Mills, Providence, R. I.
Jos. Burlingame.
George L. Gross, G. L. & H. J. Gross.
W. H. Jennings, Algonquin Prtg. Co., Fall River, Mass.
J. A. Chadwicks, Algonquin Prtg. Co., Fall River, Mass.
John R. Love, Treas. Indianapolis Bichy., Indianapolis.
W. N. Love, Vice-Pres. Indianapolis Bichy., Indianapolis.
Wm. A. Walton, Providence, R. I.

W. P. Dempsey, Treas. Dempsey B. & D. Wks., Pawtucket, R. I.
Earl P. Mason, Newport Engineering Wks., Newport, R. I.
A. Livingston Mason, Newport Engineering Wks., Newport, R. I.
Jas. N. Bourne, Pontiac Bleachery, Pontiac, R. I.
E. J. McCaughey, Home Bleach & D. Wks., Pawtucket, R. I.
Peter D. McManus, Jr., Home Bleach and D. Works, Pawtucket, R. I.
Chas. A. Johnson, New York City.
Peter H. Corr, Taunton, Mass.
C. P. Chappell, Supt. Factory C Textile Fin. Mchy. Co.

Tangol.

The Arabol Mfg. Co., 100 William Street, New York, well known to our readers for their standard sizing and finishing compounds, have recently brought out a new product, which they call Tangol. It is a vegetable glue in granular form, which readily dissolves in cold or hot water. It is used in sizing, finishing, weighting, dyeing, waterproofing and fireproofing. It is said to combine readily with organic and mineral colors, chemicals, soaps, fats, oils, and other materials applied to textile goods. The Arabol Mfg. Co. have issued a pamphlet describing the uses of Tangol, together with a list of materials which combine with it and of such as precipitate it and make it insoluble in water.

American Water Softener Co. Acquires the Hungerford Filter.

The American Water Softener Co., whose main offices are at 1011 Chestnut Street, Philadelphia, have recently taken over the business of the Hungerford Filter Corporation, and are now the manufacturers of the Hungerford filter. They are thus in a position to install in industrial plants either filtered or softened water systems. The subject of a pure water supply is very much more appreciated in textile mills than it was some years ago. It is now realized that keeping scale, corrosion and mud out of the boilers is a good financial investment, while pure and softened water for the manufacturing processes is equally so and helps produce better goods.

A New Finishing Material.

The Nicetown Mfg. Co., 4303-09 North 18th St., Nicetown, Philadelphia, is sending out trial packages of "Loydalene," a new finishing material for cotton worsteds and all kinds of union and low grade goods. The object of "Loydalene" is to put a satisfactory finish on the goods, which will not change under exposure to almost any conditions. It builds up the fabric giving the effect of closer woven goods.

Instructions for using "Loydalene" are simply to boil up a quantity in water in the proportion of one pound to a gallon. After this solution has cooled to about 120° F., about 4 gallons to the 100 pounds is added to the washer in which the cloth is just covered with clear water. The "Loydalene" solution permeates the goods and remains when the water is extracted. In addition to giving a finish which is firm and permanent, considerable weight is added to the goods.

It can also be used satisfactorily on some classes of knit goods. The manufacturers will gladly send a trial package to all who are interested.

Bleaching Skein Yarn.

John F. Davidson, proprietor of the Orianna Bleach Works, 2560-62-64 North Third St., Philadelphia, desires to inform the trade that he is now in a position to bleach skein yarns and tapes, and is installing the necessary machinery for this purpose. This department Mr. Davidson expects to have started up on or about Oct. 1.

Keystone Knitting Needles.

The Keystone Latch Needle Co., 543 West Lehigh Ave., while new so far as its name is concerned, is one of the oldest of the manufacturers of needles for knitting machines. John C. Egly, its manager, is one of the veteran needle manufacturers in this country. He is well known throughout the knitting industry as one of the proprietors of the late Keystone Knitting Machine Co., with which he was identified up to the time it went out of business. The Keystone Latch Needle Company are manufacturers of standard and special needles. They carry a large stock of all makes of needles for knitters and ribbers and are in a position to make prompt deliveries. One of the specialties of the company is the Keystone spring bottom needle, which is suited to all kinds of knitting machines.

Supplies for Narrow Fabric Looms.

Special attention is drawn to the advertisement in this issue of Robert G. Pratt, 100 Beacon St., Worcester, Mass. Mr. Pratt, who has had the advantage of practical experience for some time with other concerns, has taken charge of an independent plant for the manufacture exclusively of supplies for narrow fabric looms. The business is located in the quarters recently occupied by A. H. Steele. The plant is equipped with the latest and best machinery obtainable and he has among his mechanics some of the most experienced shuttle and batten makers, men that are thoroughly familiar with the different makes of looms. His products include straight shuttles and blocks, fiber pinions, shuttle and lay racks, shuttle springs, and quill winders.

More Attention Given to Filtration.

A notable feature in connection with textile manufacture is the attention now paid to filtration. Many of the most important bleacheries, dye works, etc., have already installed extensive filtration plants and at the present time the plans of most projected textile establishments include a complete filtration plant as part of their equipment.

Hungerford & Terry, filtration engineers of 1412 Pennsylvania Building, Philadelphia, Pa., report a decided increase in the number of orders received from textile establishments. They have

recently installed, or have in process of construction, plants in textile mills having a capacity in the aggregate of nine million gallons per day.

Among some of the larger installations are, The Weidmann Silk Dyeing Co., Paterson, N. J.; Passaic Print Works, Passaic, N. J.; Bellman Brook Bleachery, Fairview, N. J.; James R. Ward & Son, Philadelphia, Pa.; The North Adams Mfg. Co., North Adams, Mass.; Jacob Nolde of Nolde & Horst, Reading, Pa.; The E. R. Meinig Co., Silk Glove Mfrs., Reading, Pa.

Many other important mills in the country are also considering installations or enlargements of their present plants.

Recent Textile Patents.

BALE FORMING APPARATUS. 865,316. Edgar Reagan, San Antonio, Texas, assignor to Reagan Bale Co., San Antonio, Texas.

BALING FIBROUS MATERIAL and Bale. Method of. 864,975. Charles J. Luce, Niantic, Conn., assignor to the Luce Compress & Cotton Co., New Orleans, La.

BOBBIN HOLDER. 864,480. Thomas J. Murdock, Franklin, Mass., assignor to Murdock & Geb Co., Franklin, Mass.

CARDING ENGINE. 864,515. Michael Collins, Lowell, Mass.

CARDING MACHINE FEEDER. 864,933. James Stewart, Grand Rapids, Mich.

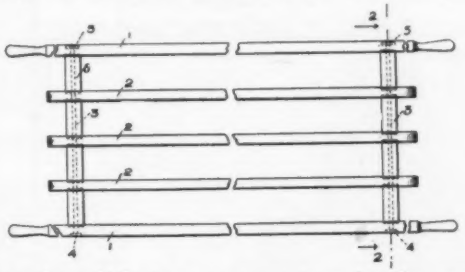
COMBING MACHINE. 864,197. Elwin H. Rooney, New Bedford, Mass., assignor to the Whitin Machine Works, Whitinsville, Mass.

COMBING MACHINE. 864,184. Timothy O'Connell, Holyoke, Mass., assignor to the Whitin Machine Works, Whitinsville, Mass.

DYE JIGGER. 866,058. Willy Peters, Dusseldorf, Germany.

DYEING ESTABLISHMENTS. Horse for. 864,309. Jacob Knott, Paterson, N. J.

This invention relates to an improved horse for carrying the silk or the hanks of dyeing establishments from one dye-vat to the other, and constructed in such a manner that the dye liquid cannot attack the transverse bolts by which the longitudinal and transverse pieces of these horses are connected with each other.. It consists of a plurality of longitudinal bars, certain of which, preferably the outer or side bars, are made longer



than the middle bars, so as to form handles, and of transverse tie-rods passing through the longitudinal bars, and wooden sleeves placed on the transverse tie-rods. These sleeves are seated at the ends in depressions in the longitudinal bars, the floors of such depressions being convex, and fit into corresponding concaved depressions in the ends of the sleeves so as to make a tight, rigid joint between the sleeves and the bars to protect the tie-rods against dye-liquor.

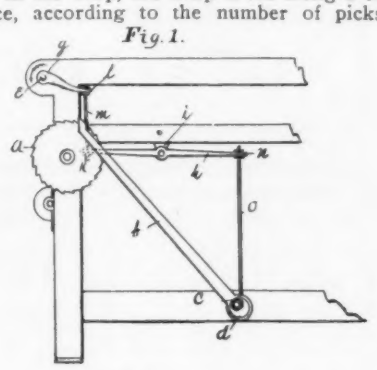
LOOM FOR WEAVING Pile Fabrics. 865,332. Albert G. Cowell, Kidderminster, England.

LOOM. Weft Replenishing. 864,499. Horace Wyman, Worcester, Mass., assignor to Crompton & Knowles Loom Works.

LOOM. 865,122. Moses Perreault, New Bedford. Mass.

The object of this invention is to prevent the imperfections in cloth, which are caused when the filling breaks, by the succeeding thread not occupying the position it should, and thereby causing a thin place in the cloth. As each filling thread is placed in the warp, the warp is fed along a certain distance, according to the number of picks per

Fig. 1.



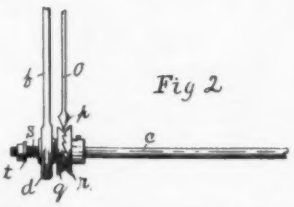


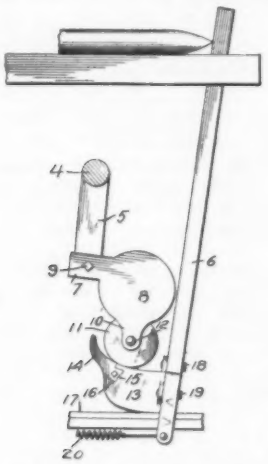
Fig 2

inch the cloth is being woven. Now when the filling breaks, or runs out, and the loom is stopped by the filling fork, it does not stop instantly, but makes a portion of, if not a whole revolution, and perhaps more, through the action of the operative in piecing up the broken thread, or supplying the shuttle with filling. The purpose of this invention, through the ordinary action of the filling fork, is to arrest the motion of the warp at the instant the filling fails, and cause it to remain stationary, until the loom is put in motion again by the shifting lever. This object is attained by the mechanism illustrated in the accompanying drawing.

LOOMS. Picker Stick Motion for. 864,213. Robert Taylor, New Bedford, Mass.

It is the object of this invention to actuate the picker stick directly by the shoe, doing away with

the employment of lug-straps and all other loops and straps that are liable to effect breakages and cause loss of time in the holding up of the loom while repairs are being made, as well, also, as avoiding the great expense involved in making repairs. Besides this, it is the purpose of the improvements to simplify the construction of the means for effecting the picking movement of the stick securing a smoother and more regular action, and hence the production of better work.



As indicated in the drawings, the device is readily applicable to a power-loom in which the picker stick is secured at its base to a shoe or rocker that rocks on a supporting stand to assist in securing a right-line motion of the upper end of the stick while in engagement with the shuttle in the act of picking it through the shed. Instead of employing straps connected with the picker motion to effect the quick forward movement of the stick, the picking is done by the shoe, adding this office to the latter device.

LOOM WEFT Replenishing. 864,956. Joseph T. Cyr, Worcester, Mass., assignor to Crompton & Knowles Loom Works.

LOOMS. Bobbin Feeding Device for Weft Replenishing. 865,376. Johannes Gabler and Robert Kunz, Mulhausen, Germany.

LOOMS. Thin Place Detector for. 864,352. Edward F. Allen, Boston, Mass., assignor to Draper Co., Hopedale, Mass.

LOOMS. Thread Clearing and Parting Mechanism for Weft Replenishing. 866,051. Jonas Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

LOOMS. Thread Parting Mechanism for. 866,052. Jonas Northrop, Hopedale, Mass., assignor to Draper Co., Hopedale, Mass.

SPINNING MACHINE. Ring. 865,048. Achille Klein, Roubaix, France.

SPINNING MACHINE. Ring. 865,144. Thomas Yates, Salford, England.

SPINNING MULE. 865,947. William D. Rundlett, North Andover, Mass., assignor to Davis & Furber Machine Co.

SPINNING AND TWISTING Frames. Ring Traveler for. 865,242. Theodor Demoulin, Bielitz, Austria-Hungary.

This invention relates to a ring traveler which runs upon a track mounted in the usual manner upon a base of conical form. The arrangement, however, differs from that heretofore adopted in devices of similar construction in that the track is mounted on the base in such a manner that it is inclined to the horizontal. By this means not only are the friction surfaces considerably decreased, but the traveler is maintained in such a relation to the track, f, that its path runs always concentric with the ring and that it is carried along smoothly in all phases of the formation of the cop.

Fig. 1

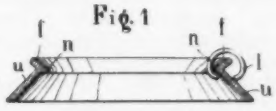
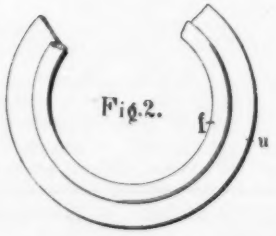


Fig. 2.



The fact that the traveler is so easily carried along when the spindle is set going enables fibrous material of a very low grade to be spun. The easy movement of the traveler on the ring, due to the alteration made in the friction surfaces, moreover, secures the still greater advantage that, when very high numbers of yarn are being spun there can be employed travelers that are several degrees stronger than those which could heretofore be made use of under like circumstances; the constructions heretofore usual necessitating the use of

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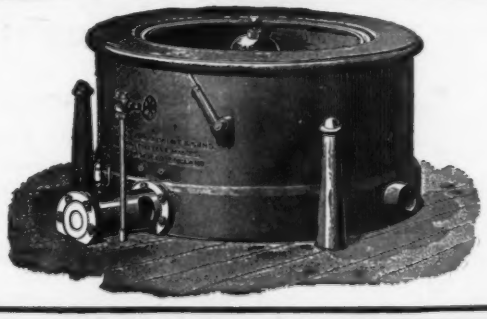

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Half of this is from tight belts.

Cling-Surface permits every belt to be run easy and carry fullest loads and turns this half from overcoming friction to doing work.

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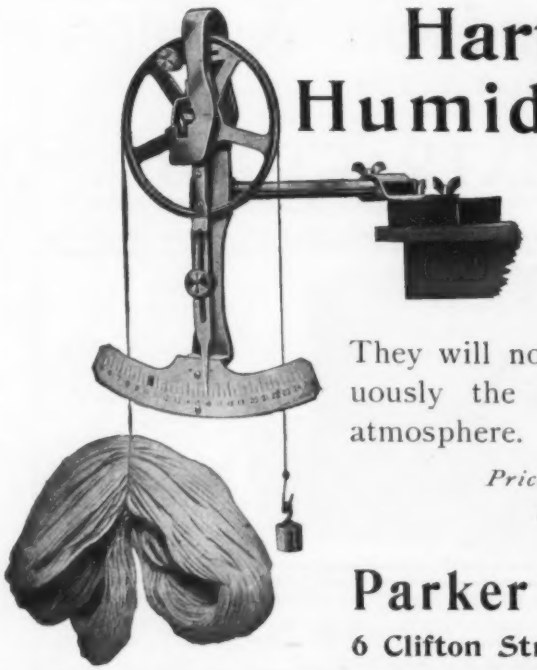

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They will note automatically and continuously the moisture condition of the atmosphere.

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Advertisers whose names do not appear under desired headings will please notify the publishers. Such omissions are accidental, not intentional.

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Dixon, Jos., Crucible Co.
Lowell Crayon Co.

Cutters for Knit Goods.
Langston, Samuel M.

Cutting Machines.
Adams, A. L.
Cameron Machine Co.

Cylinder Oil (Superheated Steam).
Power Specialty Co.

Dextrine.
Stein, Hirsh & Co.

Dobbies.
Crompton & Knowles Loom Works.
Kilburn, Lincoln & Co.
Stafford, G. W., Mfg. Co.

Draughtsmen.
Cameron Machine Co.

Drawing Rolls.
Hood, R. H.
Jefferson, Edward & Brother.
Metallic Drawing Roll Co., The.

Drying Machinery.
American Blower Co.
American Drying Machinery Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch, Arthur, Arlington Mch. Wks.
Birch Bros., Somerville Machine Wks.
Butterworth, H. W., & Sons Co.
Cell Drier Machine Co.
Hunter, Jas., Machine Co.
Jefferson, Edward & Brother.
Kenyon, D. R., & Son.
Mass. Fan Co.
Philadelphia Drying Machinery Co.
Sargent's, C. G., Sons.
Schwartz, L. H. A., & Co.
Sturtevant, B. F., Co.
Textile Finishing Machinery Co.
Tolhurst Machine Works.
Whiteley, William, & Sons, Ltd.

Drying Boards.
Bull, William C.
Pearson, J. T.

Dusters.
——See Wool and Waste Dusters.

Dust Collectors.
Philadelphia Drying Machinery Co.
Sterling Blower & Pipe Mfg. Co.
Sturtevant, B. F., Co.

Dyers, Bleachers and Finishers.
Brophy's, T., Sons.
Davidson, J. F.
Firth & Foster Co.
Germania Dye Works.
Globe Dye Works Co.
Home Bleach & Dye Works.
Lorimer's, The Wm. H., & Sons Co.
Pawtucket Dyeing & Bleaching Co.
Peerless Co.
Rowland, Samuel.
Scranton Yarn Finishing Co.
Solway Dyeing & Textile Co.
Western Thread & Dye Works.

Dyeing, Drying, Bleaching and Finishing Machinery.
Allen, William, Sons Co.
American Blower Co.
American Drying Machinery Co.
American Dyeing Machine Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch, Arthur, Arlington Mch. Wks.
Birch Bros., Somerville Machine Wks.
Butterworth, H. W., & Sons Co.
Cell Drier Machine Co.
Cohnen Dyeing Machine Co.
Curtis & Marble Machine Co.
Entwistle, T. C., Co.
Gessner, David.
Heathcote, John, & Son.
Hopkins Machine Works.
Hunt, Rodney, Machine Company.
Hunter, James, Machine Co.
Kenyon, D. R., & Son.
Klauder-Weldon Dyeing Machine Co.
Klipstein, A., & Co.
Leigh, Evan A.
Leyland, Thos., & Co.
Parks & Woolson Machine Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Schwartz, L. H. A., & Co.
Smith, Drum & Co.
Sirocco Engineering Co.
Sturtevant, B. F., Co. (Drying).
Textile Finishing Machinery Co.
Tolhurst Machine Works.
Whiteley, William, & Sons, Ltd.

Dye House Cans.
Hill, James, Mfg. Co.

Dye House Floors.
Simpson Bros. Corporation.

Dye House Trucks.
Bailey, Frank.

Dye Sticks.
Bailey, Frank.
Haedrich, E. M.

Dye Tubs.
——See Tanks, Tubs and Vats.

Dyestuffs and Chemicals.
American Dyewood Co.
Atteaux, F. E., & Co.
Badische Co.
Berlin Aniline Works.
Bischoff & Co.
Bosson & Lane.
Cassella Color Co.
Kalle & Co.
Ford, J. B., Co.
Geisenheimer & Co.
Johnson, Chas. A., & Co.
Klipstein, A., & Co.
Leyland, Thos., & Co.
Metz, H. A., & Co.
Roessler & Hasslacher Chemical Co.
Solvay Process Co.
Sykes, Walter F., & Co.
Thayer, Ed. M., & Co.

Edgings.
——See Tapes, Braids and Edgings.

Electrical Construction.
Crocker-Wheeler Co.
General Electric Co.
Sturtevant, B. F., Company.
Westinghouse Electric & Mfg. Co.

Electrical Engineer (Consulting.)
Puffer, William L.

Electrical Heating Devices.
Johns-Manville Co., H. W.

Electrical Supplies.
Johns-Manville Co., H. W.
Pettingell-Andrews Co.

Electric Driven Pumps.
Dean Bros. Steam Pump Works.

Electric Fans.
American Blower Co.
Crocker-Wheeler Co.
General Electric Co.
Mass. Fan Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Sterling Blower & Pipe Mfg. Co.
Sturtevant, B. F., Co.
Westinghouse Electric & Mfg. Co.

Electric Hoists.
Northern Engineering Works.
Yale & Towne Mfg. Co.

Electric Lamps.
Pettingell-Andrews Co.

Electric Lighting.
General Electric Co.
Sturtevant, B. F., Co.
Westinghouse Electric & Mfg. Co.

Electric Motors.
Crocker-Wheeler Co.
General Electric Co.
Sturtevant, B. F., Co.
Westinghouse Electric & Mfg. Co.

Elevators.
Salem Elevator Works.

Embossing Machines.
Cameron Machine Co.

Employees' Time Recorders.
Pettes & Randall Co.

Enamels.
Nubian Paint & Varnish Co.

Exhaust Heads.
Sterling Blower & Pipe Mfg. Co.
Sturtevant, B. F., Co.

Expansion Joints.
Power Specialty Co.

Fans—Exhaust and Ventilating.
——See Ventilating Apparatus.

Feed Water Heaters.
Green Fuel Economizer Co.
Harrison Safety Boiler Works.
Scaife, W. B., & Sons.

Feed Water Pumps.
Dean Bros. Steam Pump Works.
Gould's Mfg. Co.

Feed Water Purifiers.
Harrison Safety Boiler Works.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons.

Feeds.
——See Automatic Feeds.

Felt Hardeners.
Farrel Foundry and Machine Co.

Felting Machinery.
Farrel Foundry and Machine Co.

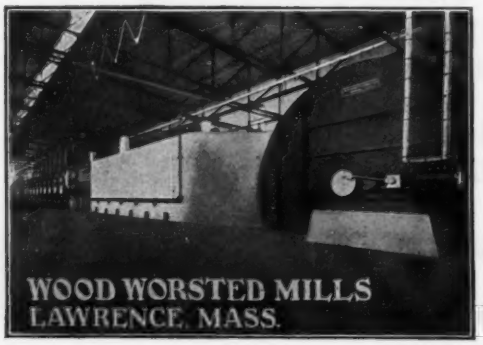
Fibre Spools.
Cell Drier Machine Co.
Rhode Island Fibre Spool Co.

Filters.
American Water Softener Co.
Norwood Engineering Co.
Phila. Water Purification Co., The.
Scaife, W. B., & Sons.

Finishing Machinery.
——See Dyeing, Drying, Bleaching and Finishing.

Alphabetical Advertising Index, with page numbers, follows this list.

Stop Throwing Away Money.


WOOD WORSTED MILLS
LAWRENCE, MASS.

A STURTEVANT ECONOMIZER will put in your pocket the dollars now escaping from your chimney in the form of heat.

The Sturtevant Economizer

Saves 10 to 25 per cent of the fuel; purifies the feed water; reduces amount of smoke; increases boiler capacity 20 to 40 per cent. Can be used with a chimney or with a fan.

Built for plants of any size, and for pressures up to 300 pounds. **All joints metal-to-metal. Not a gasket.**

Send for Bulletins Nos. 128 and 132.

B. F. STURTEVANT CO., BOSTON, MASS.

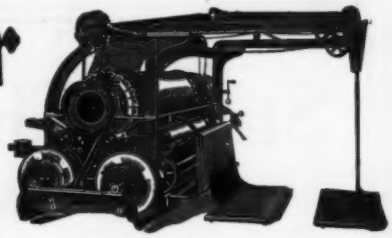
General Office and Works, Hyde Park, Mass.

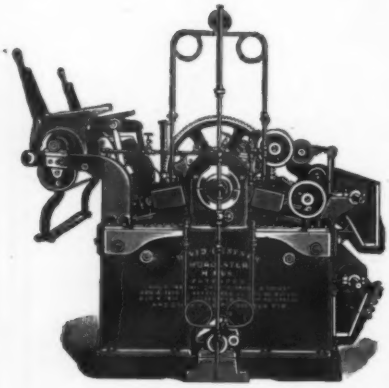
NEW YORK PHILADELPHIA CHICAGO CINCINNATI LONDON

Designers and Builders of Heating, Ventilating, Drying and Mechanical Draft Apparatus; Fan Blowers and Exhausters; Rotary Blowers and Exhausters; Steam Engines, Electric Motors and Generating Sets; Pneumatic Separators, Fuel Economizers, Forges, Exhaust Heads, Steam Traps, etc. 628

David Gessner

Worcester, Mass.

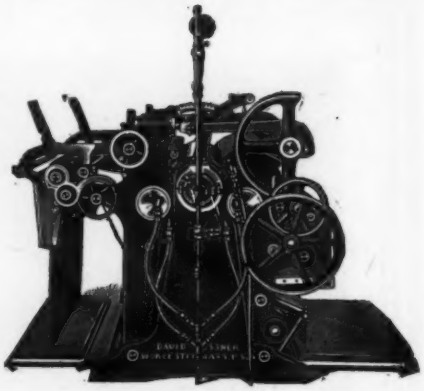




Latest Improved Cloth Finishing Machinery

—

Napping Machines and Presses a Specialty



Fire Brick.
Borgner, Cyrus, Co.
Fire Extinguishers.
Badger, E. B., & Sons Co.
Johns-Manville Co., H. W.
Fire Hose.
Eureka Fire Hose Co.
Fire Hydrants.
Norwood Engineering Co.
Fire Insurance.
Home Insurance Co.
Fire Proof Doors and Windows.
Badger, E. B., & Sons Co.
Irwin, Thos. W., Mfg. Co.
Flax, Tow, Hemp and Jute Machinery.
Fairbairn-Lawson-Combes-Barbour, Ltd.
Fluted Rolls.
Hood, R. H.
Leigh, Evan A.
Jefferson, Edward & Brother.
Riley, C. E., Company.
Thurston, A. G., & Son.
Flyers.
Bodden, Wm., & Son, Ltd.
Hopkins Machine Works.
Jefferson, Edward & Brother.
Leigh, Evan A.
Textile Machinery Co.
Forges.
Sturtevant, B. F., Co.
Forwarders.
Salvator Transfer, Inc.
Friction Cones.
Evans, G. Frank.
Friction Rings.
National Brake & Clutch Co.
Fuel Economizers.
Green Fuel Economizer Co.
Sturtevant, B. F., Co.
Fulling Mills for Woolen Goods.
Hunt, Rodney, Machine Co.
Hopkins Machine Works.
Hunter, Jas., Machine Co.
Kenyon, D. R., & Son.
Furnaces (Automatic Smokeless).
Murphy Iron Works.
Garnetts.
Leigh, Evan A.
Smith & Furbush Machine Co.
Gas Blowers and Exhausters.
Sturtevant, B. F., Co.
Gas Engines.
Jones, Lewis.
Gaskets (Superheated Steam).
Power Specialty Co.
Gassing Machines.
Stubbs, Joseph.
Gauges.
Crosby Steam Gage & Valve Co.
Walworth Manufacturing Co.
Gears.
Farrel Foundry and Machine Co.
New Process Raw Hide Co.
Philadelphia Gear Works, Inc.
Gear Cutting.
Farrel Foundry and Machine Co.
Gear Cutting Machine.
Whiton, The D. E., Co.
Generating Sets.
Crocker-Wheeler Co.
Sturtevant, B. F., Co.
Glue.
Union Casein Co.
Grease.
Cook's, Adam, Sons.
Grease Cups.
Cook's, Adam, Sons.
Grids for Lappers.
Schaellibaum, R., Co.
Hand Protector.
Hall, F. W.
Heddles.
Steel Heddle Mfg. Co.
Stoddard, Haserick, Richards & Co.
Hoisting Apparatus.
Economy Engineering Co.
Northern Engineering Works.
Yale & Towne Mfg. Co.
Hosiery Boards.
Pearson, J. T.
Hosiery Labels.
Beck, Charles, Paper Co.
Kaumagraph Company.
Humidifying Apparatus.
American Moistening Co.
Bell Pure Air & Cooling Co.
Humidity Scales.
Parker Mfg. Co.
Hydraulic Rams.
Power Specialty Co.
Hydro Extractors.
American Tool & Machine Co.
Broadbent, Thomas, & Sons.
Hunt, Rodney, Machine Company.
Riley, C. E., Company.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Tolhurst Machine Works.
Whiteley, William, & Sons, Ltd.
Illuminating Engineer.
Puffer, William L.
Insulating and Braiding Silks.
Sauquoit Silk Mfg. Co.
Insurance (Casualty, Fire and for Loss of Profits.)
Home Insurance Co.
Maryland Casualty Co.
Investments.
Cross Creek Coal Co.
Invoices Discounted.
Cathrall, W. M.
Jacquards.
Halton's, Thomas, Sons.
Knit Goods, Edgings, Trimmings, Etc.
Chapin, Geo. W.
Charles, W. B.
Cheney Bros.
Friedberger-Aaron Mfg. Co.
Krout & Fite Mfg. Co.
Weimar Bros.

Alphabetical Advertising Index, with page numbers, follows this list.

"O.K." PEERLESS INCANDESCENT LAMPS

Our "O.K." Peerless Lamps are without exception the best lamps for Mill Lighting. We know that if you give them a trial you will be more than satisfied.

We want your contract, and should be pleased to have our lamp expert call on you, and ascertain just what type of lamp is best adapted to your purpose.

Pettingell-Andrews Company,

BOSTON, - - - - - - - - MASS.

Knit Goods, Finishing Machines, Crochet, Etc.
Hunt, Rodney, Machine Company.
Langston, Samuel M.
Merrow Machine Co., The.
Nye & Tredick Co.
Robinhold Machine Co.
Scott & Williams.
Union Special Machine Co.
Willcox & Gibbs Sewing Machine Co.

Knitting Machine Cylinders.
Paxton & O'Neill.
Stafford & Holt.

Knitting Machinery.
Boss Knitting Machine Co.
Brinton, H., & Co.
Claes & Flentje.
Cooper, Chas.
Crane Mfg. Co.
Excelsior Knitting Machine Mfg. Co.
Gormly, Robt. W., & Co.
Grosser Knitting Machine Co.
Hemphill Mfg. Co.
Jenckes, E., Mfg. Co.
Jones, Lewis.
Lamb Knitting Mach. Mfg. Co.
Leighton Machine Co.
Mayo, Geo. D., Knitting Machine Co.
Mayo Knitting Machine & Needle Co.
National Automatic Knitter Co.
Nye & Tredick Co.
Paxton & O'Neill.
Ruth Machine Co.
Scott & Williams.
Stafford & Holt.
Standard Machine Co.
Taylor, James.
Tompkins Bros.
Walter & Co.
Walther, Otto.
Wildmen Mfg. Co.

Knitting Needles and Supplies.
Breedon's, Wm., Son.
Brinton, H., & Co.
Continental Latch Needle Company.
Cooper, Chas.
Corey, Wm., Co.
Crane Mfg. Co.
Dodge Needle Co.
Excelsior Needle Co.
Grosser Knitting Machine Co.
Ives, L. T., Co.
Jarrard Needle Co.
Lamb Knitting Machine Mfg. Co.
Keystone Latch Needle Co.
Mayo Knitting Machine & Needle Co.
Page Needle Co.
Ruth Machine Co.
Wardwell Needle Co.

Labeling Machines.
Beck, Chas., Paper Co., Ltd.

Lamps, Incandescent.
General Electric Co.
Pettingell-Andrews Co.
Westinghouse Electric & Mfg. Co.

Lawyers (Mercantile).
Yeomans & Ironside.

Leather for Textile Use.
Bowes, L. M., Co.

Loom Pickers.
Garland Mfg. Co.

Looms.
Crompton & Knowles Loom Works.
Draper Company.
Kilburn, Lincoln & Co.
Leigh, Evan A.
Lowell Machine Shop.
Mason Machine Works.
Stafford, Geo. W., Co.
Stoddard, Haserick, Richards & Co.
Whitin Machine Works.

Loopers.
Beattie Machine Works.
Hepworth, John W., & Co.
Leighton Machine Co.

Lubricants.
Cook's, Adam, Son.
Borne, Scrymser Co.
Dixon, Jos., Crucible Co.

Lubricators.
Cook's, Adam, Son.
Detroit Lubricator Co.

Lumber (Box, Etc.).
Connecticut Box Co.

Lumpers.
Gerry, George, & Son.
Schofield, Wm., Co.

Machine Designers.
Cameron Machine Co.

Machinery Dealers.
Jefferson, Ed., & Bro.
Lamb, J. K., Textile Mach. Co.
Schofield, Geo. L.
Stead, Arthur.
Taylor, James.

Machinists.
Cameron Machine Co.

Machinists' Tools.
Whitin, The D. E., Co.

Mails.
Walder, J.

Marking Brushes.
Universal Fountain Brush Co.

Measuring and Folding Machines.
Curtis & Marble Machine Co.
Elliott & Hall.
Parks & Woolson Machine Co.

Mechanical Draft.
American Blower Co.
Green Fuel Economizer Co.
Massachusetts Fan Co.
Sturtevant, B. F., Co.

Mechanical Draughtsmen.
Cameron Machine Co.

Mechanical Engineers.
American Blower Co.
Gilbreth, Frank B.
Main, Chas. T.
Philadelphia Drying Machinery Co.
Sturtevant, B. F., Co.

Mechanical Stokers.
Murphy Iron Works.

Alphabetical Advertising Index, with page numbers, follows this list.

Mercerizers.
Globe Dye Works Co.
Home Bleach & Dye Works.
Lorrimer, Wm. H., Sons Co.

Mercerising Machinery.
Butterworth, H. W., & Sons.
Klauder-Weldon Dyeing Machine Co.
Parks & Woolson Machine Co.
Smith, Drum & Co.
Textile Finishing Machinery Co.
Whiteley, William, & Sons, Ltd.

Metallic Fire-proof Window Frames and Sashes.
Badger, E. B., & Sons Co.

Metallic Packing.
Power Specialty Co.

Mill Builders and Engineers.
Ferguson, John W.

Mill Supplies.
American Supply Co.
Bamford & Smith.
Barker, James.
Buckley's, Benjamin, Sons.
Crosby Steam Gage and Valve Co.
Easton-Burnham Co.
Eureka Fire Hose Co.
Garland Mfg. Co.
Jefferson, Ed., & Bro.
Lane, W. T., & Bro.
Leigh, Evan A.
Main Belting Co.
Morris & Co.
Murphy, E. W., & Co.
Philadelphia Drying Machinery Co.
Pratt, R. C.
Riley, C. E., Company.
Richardson Bros.
Schaellibaum, R., Co.
Shaw, Victor, Ring Traveler Co.
Stephenson Mfg. Co.
Stoddard, Haserick, Richards & Co.
Thurston, A. G., & Son.
Ward & Vandegrift.
Walworth Manufacturing Co.

Mineral Wool.
Johns-Manville Co., H. W.

Napping Machinery.
Birch Bros., Somerville Machine Wks.
Curtis & Marble Machine Co.
Gessner, David.
Jones, Lewis.
Leigh, Evan A.
Parks & Woolson Machine Co.
Whiteley, William, & Sons, Ltd.

Noils (Silk).
Malcolm Mills Co.
Ryle, Wm., & Co.

Oil and Waste Saving Machines.
Oil & Waste Saving Machine Co.

Oil Cups.
Walworth Manufacturing Co.

Oil Engines.
International Oil Engine Co.

Oils.
Borne, Scrymser Co.
Cook's, Adam, Son.
Excelsior Wool Oil Compond Co.
Harding & Fancourt.
Murphy, E. W., & Co.
New York & New Jersey Lubricant Co.
Stephenson Mfg. Co.
Zurn, O. F., Co.

Overhead Track and Trolley Systems.
Northern Engineering Works.

Overseaming Machines.
Merrow Machine Co.
Willcox & Gibbs Sewing Machine Co.

Packings (Asbestos Steam).
Johns-Manville Co., H. W.

Packings (Hydraulic and Pneumatic).
Detroit Leather Specialty Co.

Packings (Metallic).
Power Specialty Co.

Paints (Wood Preserving).
Carbolineum Co.

Paints and Varnishes.
Brown, C. H., Paint Co.
Nubian Paint & Varnish Co.

Pantagraphs for Mill Engraving.
Johnson, C. A., & Co.

Paper.
Merwin Paper Co.
Richardson Bros.
Smythe, J. L. N., Paper Co.

Paper Boards.
Merwin Paper Co.
Smythe, J. L. N., Paper Co.

Paper Box Machinery.
Beck, Chas., Paper Co., Ltd.
Langston, Samuel M.

Patent Solicitors.
Crosby & Gregory.
Howson & Howson.

Perforated Metals.
Hopkins Machine Works.

Peroxide of Sodium.
Roessler & Hasslacher Chemical Co.

Pipe and Boiler Covering.
Johns-Manville Co., H. W.

Pipe Threading Machines.
Oster Mfg. Co.

Pipes and Fittings.
Pancoast, Henry B., & Co.
Scaife, W. B., & Sons.
Walworth Manufacturing Co.

Plastic Cement.
Griffin Roofing Co.

Pneumatic Conveying.
—See Ventilating.

Portable Hoists.
Economy Engineering Co.

Power Plant Engineers (Steam, Electric and Water).
Roberts & Abbott Co.

Power Transmission Machinery.
Almond, T. R., Mfg. Co.
American Drying Machinery Co.
American Mfg. Co.
American Pulley Co.
Cell Drier Machine Co.
Crosson, Geo. V., Company.
Evans, G. Frank.
Farrel Foundry and Machine Co.
Hunt, Rodney, Machine Company.
Hunter, Jas., Machine Co.
Kilburn, Lincoln & Co.
Philadelphia Drying Machinery Co.
Plymouth Cordage Co.
Reeves Pulley Co.
Saginaw Manufacturing Co.
Schofield, Wm., Co.
Sellers, William, & Co.
Textile Finishing Machinery Co.
Tolhurst Machine Works.

Preparatory Machinery (Cotton).
Howard & Bullough Am. Machine Co.
Kitson Machine Co.
Leigh, Evan A.
Riley, C. E., Company.
Saco & Pettee Machine Shops.

Presses.
Boomer & Boschert Press Co.
Butterworth, H. W., & Sons Co.
Curtis & Marble Machine Co.
Gessner, David.
Hart, Charles.
Minnich Machine Works.
Phila. Drying Machinery Co.
Spence & Rideout.
Textile Finishing Machinery Co.
Woonsocket Machine & Press Co.

Press Papers.
Merwin Paper Co.
Richardson Brothers (Importers and Dealers).

Pressure Regulators.
Crosby Steam Gage & Valve Co.
Walworth Mfg. Co.

Pulleys.
—See Power Transmitting Machinery.

Pumps.
Dean Bros. Steam Pump Works.
Goulds Mfg. Co.
Hunt, Rodney, Machine Company.
Textile Finishing Machinery Co.

Pump Governors.
Crosby Steam Gage & Valve Co.
Dean Bros. Steam Pump Works.
Walworth Mfg. Co.

Purifying & Filtration Plants.
Hungerford & Terry.
Norwood Engineering Co.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons.

Quillers.
Foster Machine Co.
Payne, G. W., & Co.

Rag Pickers.
Schofield, Wm., Co.
Smith & Furbush Machine Co.

Ramie Tops and Noils.
Tierney, Frank A.

Raw Hide Gears.
New Process Raw Hide Co.
Philadelphia Gear Works, Inc.

Reed and Harness Manufacturers.
American Supply Co.
Garland Mfg. Co.
Walder, J.

Reducing Valves.
Crosby Steam Gage & Valve Co.
Walworth Mfg. Co.

Regulators (Pressure).
Crosby Steam Gage & Valve Co.
Walworth Mfg. Co.

Remnants.
Feingold, H. & D.

Ribbon Cutters.
Cameron Machine Co.

Ribbons.
Cheney Bros.

Ring Travelers.
DeHaven Mfg. Co.
Shaw, Victor, Ring Traveler Co.

Roofing.
Griffin Roofing Co.
Standard Paint Co.

Roofing Material.
Johns-Manville Co., H. W.

Alphabetical Advertising Index, with page numbers, follows this list.

GRIFFIN ROOFING COMPANY
506 W. 26 ST., NEW YORK CITY BADGER AND AVON AVE., NEWARK
ESTIMATES FURNISHED FOR
GRAVEL, SLAG, PLASTIC CEMENT, OR ANY KIND OF COMPOSITION ROOFING
ON NEW OR OLD BUILDINGS FLAT OR STEEP ROOFS.
OUT OF TOWN WORK AT SLIGHT ADVANCE OVER CITY PRICES

RUBEROID

(Registered U. S. Pat. Office)

The one roofing which meets all requirements for buildings devoted to

Textile Manufacture

Resists great heat; not affected by climatic changes; acid proof. Most durable roofing known.

ROOFING

Contains no tar, paper or rubber. Will not melt, rot, crack or corrode. Fire-resisting. Invaluable for

Mills, Dye Houses and Saw Tooth Roofs

Send for prices and samples.

THE STANDARD PAINT CO.,
100 William St., New York.
Chicago, St. Louis, Philadelphia, Boston, Atlanta

Roller Leather.
Bowes, L. M., Co.
Jefferson, Edward & Brother.

Rope.
American Mfg. Co.
Plymouth Cordage Co.

Rope Transmission.
American Mfg. Co.
Cresson, Geo. V., Company.
Hunt, Rodney, Machine Company.
Plymouth Cordage Co.

Roving Cans.
Hill, James, Mfg. Co.

Rubber Rolls.
Boston Belting Co.

Ruberoid Roofing.
Standard Paint Co.

Scallop Machines.
Merrow Machine Co.

Schools.
International Correspondence Schools.
Lowell Textile School.
New Bedford Textile School.
Philadelphia Textile School.

Secondhand Machinery.
—See Mchry. Dealers, also classified Ads.

Separators (Yarn).
Draper Co., The.

Separators (Oil and Steam).
Harrison Safety Boiler Works.

Sewing Machines and Supplies.
Arlington Mch. Wks. (Arthur Birch, prop.)
Birch Bros., Somerville Machine Wks.
Curtis & Marble Machine Co.
Dinsmore Mfg. Co.
Fales, L. F.
Manufacturers' Supplies Co.
Textile Finishing Machinery Co.
Union Special Machine Co.
Walter & Co.
Wilcox & Gibbs Sewing Machine Co.

Sheet Metal Work.
Scaife, W. B., & Sons.
Sterling Blower & Pipe Mfg. Co.

Shell Rolls.
Thurston, A. G., & Son.

Shoddies.
—See Wool Shoddies.

Shook (Box).
Connecticut Box Co.

Shuttles.
—See Bobbins, Spools, Shuttles, Etc.

Silk Machinery.
Arlington Mch. Wks. (Arthur Birch, prop.)
Butterworth, H. W., Sons Co.
Leigh, Evan A.
Mason Machine Works.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.

Silk Mill Supplies.
Hall, I. A., & Co.

Silk Noils.
Fawcett, Hughes.

Singe Plates.
Arlington Mch. Wks. (Arthur Birch, prop.)
Butterworth, H. W., Sons Co.
Taunton, New Bedford Copper Co.
Textile Finishing Machinery Co.

Singeing Machines.
Arlington Mch. Wks. (Arthur Birch, prop.)
Butterworth, H. W., Sons Co.
Curtis & Marble Machine Co.
Leigh, Evan A.
Smith, Drum & Co.
Stubbs, Joseph.
Textile Finishing Machinery Co.

Sizing Kettles.
Smith Sons, John E., Co.

Sizing, Starch and Gums.
Arabol Mfg. Co.
Consolidated Rendering Co.
Eustis, Pennock & Co.
Stein, Hirsch & Co.
Union Casein Co.

Skylights.
Drouve, G., Co.
Irwin, Thos. W., Mfg. Co.
Van Noorden, E., Co.

Slag and Gravel.
Griffin Roofing Co.

Slashers.
Leigh, Evan A.
Lowell Machine Shop.
Riley, C. E., Company.

Soaps.
Dobbins Soap Mfg. Co.
Nicetown Mfg. Co.
Zurn, O. F., Co.

Spindles.
Bamford & Smith.
Bodden, Wm. & Son, Ltd.
Buckley's, Benjamin, Sons.
Draper Company.
Easton-Burnham Co.
Hopkins Machine Works.
Jefferson, Edward & Brother.
Leigh, Evan A.
Riley, C. E., Company.
Stoddard, Haserick, Richards & Co.

Spindle Tubes.
Bamford & Smith.
Riley, C. E., Company.
Stoddard, Haserick, Richards & Co.

Spinning Rings.
Draper Company.
Howard & Bullough American Machino Co.
Whitinsville Spinning Ring Co.

Spinning Tubes.
Buckley's, Benjamin, Sons.
Jefferson, Edward & Brother.

Spools.
—See Bobbins, Spools, Shuttles, Etc.

Spoolers.
Draper Company.
Easton & Burnham Machine Co.
Lindsay, Hyde & Co.
Lowell Machine Shop.
Payne, George W., & Co.

Stacks.
Scaife, W. B., & Sons.

Steam Boilers.
Allen, William, Sons Co.
Harrison Safety Boiler Works.
Scaife, W. B., & Sons.

Steam Boiler Insurance.
Hartford Steam Boiler Inspection & Insurance Co.

Steam Boxes.
Allen, William, Sons Co.

Steam Engines.
American Blower Co.
Arlington Mch. Wks. (Arthur Birch, prop.)
Hooven, Owens & Rentschler Co.
Sturtevant, B. F., Co.
Textile Finishing Machinery Co.

Steam Jacket Kettles.
Badger, E. B., & Sons Co.
Smith Sons, John E., Co.

Steam Pumps.
Dean Bros. Steam Pump Works.
Goulds Manufacturing Co., The.

Steam Specialties.
Butterworth, H. W., Sons Co.
Crosby Steam Gage and Valve Co.
Sturtevant, B. F., Co.
Textile Finishing Machinery Co.
Walworth Manufacturing Co.

Steam Traps.
Albany Steam Trap Co.
American Blower Co.
Sturtevant, B. F., Co.

Steel Frame Construction.
Scaife, W. B., & Sons.

Stop Motion for Knitting Machines.
Boss Knitting Machine Works.
Ruth Machine Co.

Superheaters, Foster.
Power Specialty Co.

Tanks and Towers.
Chicago Bridge & Iron Works.

Tanks, Tubs and Vats.
Cypress Lumber Co.
Hall, Ames H., Son & Co.
Hopkins Machine Works.
Hunt, Rodney, Machine Company.
Lewis, H. F., & Co., Ltd.
Textile Finishing Machinery Co.
Tolhurst Machine Works.
Scaife, W. B., & Sons.
Stearns, A. T., Lumber Co.
Woolford, G., Tank Mfg. Co.

Tapes, Braids and Edgings.
Cathcart, John, & Co.
Chapin, George W.
Friedberger-Aaron Mfg. Co.
Krout & Fite Mfg. Co.
Maurer, F. W., & Sons Co.
Weimar Bros.

Telephones.
Pettes & Randall Co.

Temples.
Draper Co.

Alphabetical Advertising Index, with page numbers, follows this list.

A. D. LITTLE

H. J. Skinner
H. S. Mork
F. A. Olmsted
R. D. Gilbert
C. F. Woods
H. P. Carruth
S. H. Ayers

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E. G. Bailey
F. E. Gallagher
H. W. Gillett
A. L. Dean

Textile Schools.
—See Schools.

Thread Guide (Adjustable).
Palmer, I. E., Co.

Tickets and Labels.
Pioneer Ticket Co.

Tiering Machines.
Economy Engineering Co.

Time Checks.
American Railway Supply Co.

Top Cutting Machines.
Robinhold Machine Co.

Trade Mark Stamps.
Kaumagraph Co.

Trolleys.
Yale & Towne Mfg. Co.

Trucking.
Salvator Transfer, Inc.

Trucks.
Bailey, Frank.
Chase Fdy. & Mfg. Co.

Turbines.
—See Water Wheels.

Twine.
American Mfg. Co.
Plymouth Cordage Co.
Richardson Bros.

Twisting Machinery.
Jefferson, Edward & Brother.
Lowell Machine Shop.
Smith & Furbush Machine Co.

Valves.
Crosby Steam Gage & Valve Co.
Walworth Mfg. Co.

Variable Speed Transmission.
Cell Drier Machine Co.
Reeves Pulley Co.

Ventilating Apparatus.
American Moistening Co.
American Blower Co.
American Drying Machinery Co.
Barney Ventilating Fan Works.
Bell Pure Air & Cooling Co.
Berry, A. Hun.
Crocker-Wheeler Co.
Drouve, G., Co.
Green Fuel Economizer Co.
Massachusetts Fan Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Tolhurst Machine Works.
Sargent's, C. G., Sons.
Schnitzler, Chas. H.
Sirocco Engineering Co.
Sterling Pipe & Blower Co.
Sturtevant, B. F., Co.

Ventilators.
Irwin, Thos. W., Mfg. Co.

Warpers.
Draper Company.
Entwistle, T. C., Co.
Lowell Machine Shop.

Warping and Beaming Machinery.
Altemus, J. K.
Draper Company.
Entwistle, T. C., Co.
Smith & Furbush Machine Co.
Whiteley, William, & Sons, Ltd.

Warp Stop Motions.
American Textile Appliances Co.
Draper Company.
Kip-Armstrong Co.

Washers (Cloth).
Arlington Mch. Works (Arthur Birch, prop.)
Birch, Arthur, Arlington Mch. Works.
Birch Bros., Somerville Machine Wks.
Butterworth, H. W., & Sons Co.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Kenyon, D. R., & Son.
Philadelphia Drying Machinery Co.
Textile Finishing Machinery Co.

Warp Tying Machines (Automatic).
Barber-Colman Company.

Washing Soda.
Ford, J. B., Co.

Watchman's Clocks.
Nanz & Co.
Pettes & Randall Co.

Water Chemists.
Scaife, W. B., & Sons Co.

Waterproof Case Lining.
National Waterproofing Co.

Water Purifiers and Filters.
American Water Softener Co.
Hungerford & Terry.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons Co.

Water Softeners.
American Water Softener Co.
Ford, J. B., Co.
Harrison Safety Boiler Works.
Hungerford & Terry.
Philadelphia Water Purification Co.
Scaife, W. B., & Sons Co.

Water Towers.
Chicago Bridge & Iron Works.
Tippett & Wood.

Water Wheels.
Dayton Globe Iron Works.
Hunt, Rodney, Machine Co.
Leffel, James, & Co.
Risdon-Alcott Turbine Co.
Smith, S. Morgan, Co.

Water Wheel Governors.
Leffel, James, & Co.

Winders (Cotton, Woolen and Worsted).
Altemus, J. K.
Easton & Burnham Machine Co.
Foster Machine Co.
Leigh, Evan A.
Lever, Oswald, Co.
Lindsay, Hyde & Co.
Lowell Machine Shop.
Payne, Geo. W., & Co.
Universal Winding Co.
Whiteley, William, & Sons, Ltd.

Winders (Back).
Taylor, James.

Winders (Hosiery).
Altemus, Jacob K.
Easton & Burnham Machine Co.
Foster Machine Co.
Leighton Machine Co.
Lowell Machine Shop.
Payne, G. W., & Co.
Universal Winding Co.

Winches.
Yale & Towne Mfg. Co.

Wire Stitching Machines.
Beck, Chas., Paper Co., Ltd.

Wood Preserving Paints.
Carbolineum Co.

Wood Pulleys.
Saginaw Manufacturing Co.

Wool.
Schofield, Edwin F.
Stoddard, Haserick, Richards & Co.
Tierney, Frank A.

Wool Oil Compound.
Excelsior Wool Oil Compound Co.

Wool and Waste Dusters.
Jefferson, Edward & Brother.
Leigh, Evan A.
Sargent's, C. G., Sons.
Schofield, Wm., Co.
Smith & Furbush Machine Co.

Wool Cleaning Compound.
Ford, J. B., Co.

Wool Combing Machinery.
Crompton & Knowles Loom Works.
Jefferson, Edward & Brother.
Leigh, Evan A.
Riley, C. E., Company.
Stoddard, Haserick, Richards & Co.

Woolen and Worsted Machinery.
Altemus, Jacob K.
American Drying Machinery Co.
American Tool & Machine Co.
Arlington Mch. Works (Arthur Birch, prop.)
Barker, James.
Birch, Arthur, Arlington Mch. Works.
Birch Bros., Somerville Machine Wks.
Butterworth, H. W., Sons Co.
Crompton & Knowles Loom Works.
Curtis & Marble Machine Co.
Fales, L. F.
Firth, William, Co.
Gessner, David.
Harwood, Geo. S., & Son.
Hood, R. H.
Hunt, Rodney, Machine Co.
Hunter, Jas., Machine Co.
Jefferson, Ed., & Bro.
Kenyon, D. R., & Son.
Leigh, Evan A.
Lowell Machine Shop.
Parks & Woolson Machine Co.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Riley, C. E., Company.
Sargent's, C. G., Sons.
Schofield, Geo. L.
Schofield, William, Co.
Smith & Furbush Machine Co.
Stoddard, Haserick, Richards & Co.
Textile Finishing Machinery Co.
Tolhurst Machine Works.
Whiteley, William, & Sons, Ltd.
Woonsocket Machine & Press Co.

Wool, Non-shrinking Process for.
Heyer, Charles H.

Wool Oiling Apparatus.
Harwood, Geo. S., & Son.

Wool Oils.
Borne, Scrymser Co.
Excelsior Wool Oil Compound Co.

Wool Shoddies.
Collings, Taylor & Co.
Riverdale Woolen Co.
Slack, Wm. H. H., & Bro.

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American Drying Machinery Co.
Hunt, Rodney, Machine Co.

Alphabetical Advertising Index, with page numbers, follows this list.

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Hunter, Jas., Machine Co.
Jefferson, Edward & Brother.
Leigh, Evan A.
Philadelphia Drying Machinery Co.
Philadelphia Textile Machinery Co.
Riley, C. E., Company.
Sargent's, C. G., Sons.
Smith & Furbush Machine Co.
Stoddard, Haserick, Richards & Co.
Tolhurst Machine Works.

Yarns (Asbestos).
Johns-Manville Co., H. W.

YARN, THREADS, ETC.

Banding.
Moore, C., & Co.
Sternberg, Fred, & Co.
Toohey, M. J., & Co.

Cotton Yarns.
Ballou Yarn Co.
Catlin & Co.
Chalmers, Wm., & Co.
Chapin, Geo. W.
Charles, W. B.
Eddy & Street.
Germania Dye Works.
Grant Yarn Co.
Greene & Daniels Mfg. Co.
Harding, Whitman & Co.
Jenckes Spinning Co.
Littauer, Ludwig.
Lorimer, E. D., & Co.
Mitchell, Jas. E., & Co.
Montgomery, J. R., Co.
Monument Mills.
Orswell Mills.
Ravine Mills Co.
Salkeld, A. D., & Bro.
Sternberg, Fred, & Co.
Strouse, Theo. H., & Co.
Tolar & Hart.
Webb, J. C. & Co.

Flax, Hemp, Jute and Ramie.
Duncan & Youngs.
Fawcett, Hughes.
Littauer, Ludwig.
Sternberg, Fred, & Co.
Tierney, F. A.

Gassed Yarns.
Ballou Yarn Co.
Greene & Daniels Mfg. Co.
Harding, Whitman & Co.
Littauer, Ludwig.
Lorimer, E. D.
Sternberg, Fred, & Co.

Glazed Yarns.
Ballou Yarn Co.
Chapin, Geo. W.
Harding, Whitman & Co.
Littauer, Ludwig.
Lorimer's, Wm. H., & Sons Co.
Malcolm Mills Co.
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Salkeld, A. D., & Bro.
Sternberg, Fred, & Co.
Strouse, Theo. H., & Co.

Harness Twine.
Ballou Yarn Co.
Fawcett, Hughes.
Moore, C., & Co.
Sternberg, Fred, & Co.

Hosiery and Knitting Yarns.
Boyer, B. F., Co.
Chapin, George W.
Greene & Daniels Mfg. Co.
Harding, Whitman & Co.
Hyde, E. S.
Littauer, Ludwig.
Jenckes Spinning Co.
Mitchell, James E., & Co.
Monument Mills.
Sternberg, Fred, & Co.

Mercerized Yarns.
Harding, Whitman & Co.
Littauer, Ludwig.
Lorimer, E. D., & Co.
Lorimer, Wm. H., & Sons Co.
Montgomery, J. R., & Co.
Scranton Yarn Finishing Co.
Sternberg, Fred, & Co.
Strouse, Theo. H., & Co.

Mohair Yarns.
Harding, Whitman & Co.
Littauer, Ludwig.
Montgomery, J. R., & Co.

Novelty Yarns, Tinsels, Silk Noils, Etc.
Atlantic Fibre Co.
Jenckes Spinning Co.
Littauer, Ludwig.
Malcolm Mills Co.
Montgomery, J. R., & Co.
Sternberg, Fred, & Co.

Seaming Yarns.
Ravine Mills Co.

Silk Noils.
Atlantic Fibre Co.
Tierney, F. A.

Silk Yarns.
Atlantic Fibre Co.
Chapin, Geo. W.
Cheney Bros.
Eddy & Street.
Ryle, Wm., & Co.
Sauquoit Silk Mfg. Co.

Spool Cotton.
Warren, W., Thread Works.

Woolen and Merino Yarns.
Boyer, B. F., Co.
Eaton Rapids Woolen Mills.
Eddy & Street.
Germania Dye Works.
Hyde, E. S.
Jenckes Spinning Co.
Littauer, Ludwig.
Salkeld, A. D., & Bro.
Solis, Andrew J., Jr., & Co.

Woolen Yarns.
Adams, Joseph M., Co.
Littauer, Ludwig.
Stephenson & Co.

Worsted Yarns.
Boyer, B. F., Co.
Campion, Richard.
Harding, Whitman & Co.
Littauer, Ludwig.
Pocasset Worsted Co.
Salkeld, A. D., & Bro.
Stephenson & Co.

Alphabetical Advertising Index, with page numbers, follows this list.

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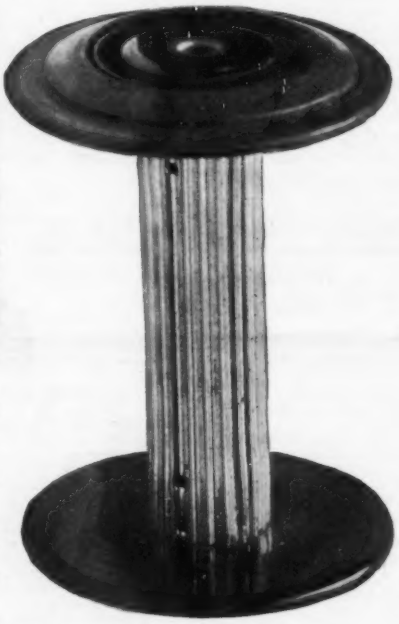

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Alphabetical Index to Advertisements.

Acme Steel Goods Co. 66
Adams, A. L. 64
Adams, Joseph M., Co. 250
Albany Steam Trap Co. 53
Allen Sons Co., Wm. 59
Almond, T. R., Mfg. Co. 47
Altemus, Jacob K. 12
American Blower Co. 287
American Ferrofix Brazing Co. 44
American Drying Machinery Co. 38
American Dyeing Machine Co... 41
American Mfg. Co. 69
American Moistening Co. 49
American Pulley Co., The 38
American Railway Supply Co... 254
American School of Correspondence 237
American Supply Co. 66
American Textile Appliances Co. 20
American Textile Specialty Machinery Co. 13
Am. Tool & Machine Co. 51
American Water Softener Co. .. 62
Arabol Mfg. Co., The 67
Arlington Machine Works 66
Ashworth Bros. 66
Atlantic Fibre Co. 247
Atteaux, F. E., & Co. 262
Badische Company 70
Badger, E. B., & Sons Co. 52
Badger Fire Extinguisher Co. .. 52
Bailey, Frank 266
Ballou Yarn Co. 246
Bamford & Smith 63
Barber Asphalt Paving Co. 56
Barber-Colman Company 21
Barker, James ..... —
Barney Ventilating Fan Works 33
Barrett Mfg. Co. ..... —
Beattie Machine Works 280
Beck Paper Co., Chas. 282
Bell Pure Air & Cooling Co. 40
Berlin Aniline Works 262
Berry, A. Hun 53
Birch, Arthur 66
Birch Brothers 52-63
Birdsboro Steel Foundry & Machine Co. 34
Bischoff, C., & Co. 263
Blaisdell, Jr., Co., The S. 246
Bodden, Wm., & Son, Ltd. 53
Boomer & Boschert Press Co. .. 242
Borgner, Cyrus Co. 287
Borne, Scrymser Co. Colored Insert
Boss Knitting Machine Works 284
Bosson & Lane 260
Boston Belting Co. 27
Bowes, The L. M., Co. 59
Boyer, B. F., Co. 248
Breedon's Son, Wm. 285
Bridgeport Realty & Trust Co.. 232
Brinton, H., & Co. 275
Broadbent, Thomas, & Sons 213
Brophy's Sons, T. 258
Brown, Chas. H., Paint Co. 252
Brown, W. H., Co. 61
Buckley's, Benj., Son. 67
Bull, William C. 278
Butterworth, H. W., & Sons Co. 1
Cameron Machine Co. 64
Campion, Richard 248
Carbolineum Wood Preserving Co. 265
Cassella Color Co. 261
Cathrall, W. M. 229
Catlin & Co. 245
Cell Drier Machine Co. Inside Back Cover
Chaffee Bros., Company 66
Chalmers & Co., Wm. 246
Chapin, Geo. W. 251
Charles, William B. 250-254
Chase Foundry & Mfg. Co. 62
Cheney Bros. 251
Chicago Belting Co. 60-65
Chicago Bridge & Iron Works.. 23
Claes & Flentje 278
Cling Surface Mfg. Co. 214
Cohnen Dyeing Machine Co. 265
Cohoes Dyeing Co. 257
Connecticut Box Co. 247
Connell, Sykes & Connell 228
Consolidated Rendering Co. 64
Continental Latch Needle Co. .. 285
Cook's Sons, Adam 55
Cooper, Chas. 281
Corey, Wm., Co. 285
Crane Mfg. Co. 284
Cresson, Geo. V., Co. 46
Crocker-Wheeler Co. 61
Crompton & Knowles Loom Works 72
Crosby & Gregory 229
Crosby Steam Gauge & Valve Mfg. Co. 242
Cross Creek Coal Co. 231
Curtis & Marble Machine Co. .. 63
Cypress Lumber Co. 263
Dannerth, Frederic 228
Davidson, J. F. 258
Dayton Globe Iron Works Co. .. 286
Dean Bros. Steam Pump Works 55
De Haven Mfg. Co. 56
Detroit Leather Specialty Co. .. 223
Detroit Lubricator Co. 67
Dinsmore Mfg. Co. 49
Dixon, Jos., Crucible Co. 287
Dobbins Soap Mfg. Co. 54
Dodge Needle Co. 285
Draper Company 3
Drouve, The G., Co. 51
Duncan & Youngs 247
East Brady Woolen Co. 254
Easton-Burnham Co. 16-39
Eaton Rapids Woolen Mills 248
Economy Engineering Co. 242
Eddy & Street 246
Elliott & Hall 67
Entwistle, T. C., Co. 63
Eureka Fire Hose Co. 53
Eustis, Pennock & Co. 28
Evans Friction Cone Co. 63
Excelsior Knitting Machine Mfg. Co. 276
Excelsior Needle Co. 285
Excelsior Wool Oil Compound Co. 58
Farbenfabriken of Elberfeld Co. 256
Fairbairn - Lawson-Combe-Barbour, Ltd. 36
Fales, L. F. 58
Farrel Foundry & Machine Co.. 37
Fawcett, Hughes 247
Feingold, H. & D. 226
Felton, S. A., & Son Co. 63
Ferguson, John W. 228
Firth & Foster Co. 257
Firth, William, Co. 54
Ford, J. B., Co. 238
Foster Machine Co. Outside Back Cover
Friedberger-Aaron Mfg. Co. 269
Gandy Belting Co. 46
Garland Mfg. Co. 55
Geisenheimer & Co. 262
General Electric Co. 25
Germania Dye Works 257
Gerry, W. Geo., & Son 56
Gessner, David 218
Gilbreth, Frank B. ..... —
Globe Dye Works Co. 258
Gormly, Robert W., & Co. 282
Goulds Mfg. Co. 59
Grant Yarn Co. 246
Green Fuel Economizer Co. 65
Greene & Daniels Mfg. Co. 244
Griffin Roofing Co. 220
Grosser Knitting Machine Co... 271
Haedrich, E. M. 262
Hall, Amos H., Son & Co. 264
Hall, F. W. 67
Hall, I. A., & Co. 66-67
Halton's, Thomas, Sons 48
Harding & Fancourt 230
Harding, Whitman & Co. 245
Harrison Safety Boiler Works .. 39
Hart, Chas. 280
Hartford Steam Boiler Inspection & Insurance Co. 62
Harwood, Geo. S., & Son ..... —
Heathcote, John, & Son 60
Hemphill Mfg. Co. 283
Hepworth, John W., & Co. 280
Heyer, Charles H. 239
Hill, James, Mfg. Co. 62
Hoffman, DeWitt & McDonough 248
Home Bleach & Dye Works 257
Home Insurance Co. 255
Hood, R. H. 61
Hooven, Owens & Rentschler Co. 267
Hopkins Machine Works 43
Howard & Bullough Am. Machine Co. 74
Howard, Austin 230
Howson & Howson 229
Hungerford & Terry 60
Hunt, Rodney, Machine Co. 14
Hunter, Jas., Machine Co. 15
Hyde, Edward S. 250
India Alkali Works 287
International Correspondence Schools 236
International Oil Engine Co. 62
Irwin, T. W., Mfg. Co. 42
Ives, L. T., Co. 285
Jarrard Needle Works 285
Jefferson, Edw., & Bro. 228
Jenckes, E., Mfg. Co. 274
Jenckes Spinning Co. 246
Johns-Manville Co., H. W. 50
Johnson, Chas. A., & Co. 280
Jones, Lewis 280
Kalle & Co. 263
Kaumagraph Company 58
Kenyon, D. R., & Son 35
Keystone Latch Needle Co. 285
Kilburn, Lincoln & Co. 29-61
Kip-Armstrong Company ..... —
Kitson Machine Shop 7
Klauder-Weldon Dyeing Machine Co., The 36
Klipstein, A., & Co. 259-265
Krout & Fite Mfg. Co. 248
Lamb Knitting Machine Co. 279
Lamb, J. K., Textile Mach. Co. 228
Labor Information Office for Italians 232
Lane, W. T., & Bro. 50
Langston, Samuel M. 284
Leffel, James, & Co. 286
Leigh, Evan Arthur 11
Leighton Machine Co. 276
Lever Oswald Co. 17
Lewis, H. F., & Co. 265
Leyland, Thomas, & Co. 41
Lindsay, Hyde & Co. 246
Littauer, Ludwig 245
Little, Arthur D. 222
Lorimer, E. D., & Co. 245
Lorimer's, Wm. H., Sons Co. .. 258
Lowe, S. C. 32
Lowell Crayon Co. 254
Lowell Machine Shop 2
Lowell Textile School ..... —
Main Belting Co. 59
Main, Chas. T. 228
Malcolm Mills Co. 248
Maryland Casualty Co. 22
Mason Brush Works 230
Mason Machine Works 10
Massachusetts Fan Co. 287
Maurer, F. W., & Sons Co. 248
Mayo Knitting Machine & Needle Co. 275
Mayo, Geo. D., Machine Co. 270
Melville, F. L. 67
Merrow Machine Co. 272
Merwin Paper Co. 247
Metallic Drawing Roll Co. 45
Metz, H. A., & Co. 260
Minnich Machine Works 58
Mitchell, Jas. E., Co. 245
Montgomery, J. R., Co. 244
Monument Mills 244
Moore, C., & Co. 247
Morris & Co. 47
Morschhauser, W. A. 30
Murphey, E. W., & Co. 278
Murphy Iron Works 51
Nanz, T., & Co. 246
National Automatic Knitter Co. 282
National Brake & Clutch Co. Colored Insert
National Waterproofing Co. 279
New Bedford Textile School 56
New England Butt Co. 284
New Process Rawhide Co. 24
New York & New Jersey Lubricant Co. 250
Nicetown Mfg. Co. 262
Northern Engineering Works .. 65
Norwood Engineering Co. 266
Nubian Paint & Varnish Co. 55
Nye & Tredick Company 270
Oil & Waste Saving Machine Co. 228

Orswell Mills 246
Oster Mfg. Co. 62
Page Needle Co. 285
Palmer, I. E., Co. 43
Pancoast, Henry B., & Co. 266
Parker Mfg. Co. 214
Pawtucket Dyeing & Bleaching Co. 258
Paxton & O'Neill 280
Payne, Geo. W., & Co. 278
Pearson, J. T. 279
Peerless Company, The 258
Pettes & Randall Co. 287
Pettingell-Andrews Co. 219
Philadelphia Drying Mchy. Co.. 34
Philadelphia Gear Works 65
Philadelphia Textile Mchy. Co. 288
Philadelphia Textile School 60
Phila. Water Purification Co. .. 60
Pioneer Ticket Co. 252
Plymouth Cordage Co. 240
Pocasset Worsted Co. 248
Power Specialty Co. 67
Pratt, Robt. G. 61
Providence Machine Co. 52
Puffer, W. L. 228
Ravine Mills Co. 246
Reeves Pulley Co. 35
Rhode Island Fibre Spool Co... 224
Richardson Bros. 257
Riley, C. E., Company 213
Risdon-Alcott Turbine Co. 286
Riverdale Woolen Co. 254
Robinhold Machine Co. 279
Roessler & Hasslacher Chemical Co. 261
Rowland, Samuel 258
Ruth Machine Co. 282
Ryle, William, & Co. 251
Saco & Pettee Machine Shops .. 5
Saginaw Mfg. Co. 65
Salem Elevator Works 48
Salkeld, A. D., & Bro. 245
Salvator Transfer, Inc. 226
Sargent's, C. G., Sons 37
Sauquoit Silk Mfg.Co. 251
Scaife, W. B., & Sons 267
Schaellibaum, Rob., Co. 19
Schnitzler, Chas. H. 279
Schofield, Edwin F. 250
Schofield, Geo. L. 246
Schofield, William, Co. 65
Schwartz, L. H. A., & Co. 31
Scott & Williams 8
Scranton Yarn Finishing Co. ... 246
Sellers, Wm., & Co. 47
Shaw, Victor, Ring Traveler Co. 66
Shultz Belting Co. 46
Simpson Bros. Corporation 56
Sirocco Engineering Co. Outside Back Cover
Slack, Wm. H. H., & Bro. 254
Smith, Drum & Co. ..... —
Smith, S. Morgan, Co. 286
Smith & Furbush Machine Co.. 288
Smith's Sons Co., John E. 226
Smythe, J. L. N., Co. 44
Solvay Process Co. 264
Solway Dyeing & Textile Co. .. 258
Spence & Rideout 279
Stafford Co., The 4
Stafford & Holt 274
Standard Fibre Co. 65
Standard Machine Co. 283
Standard Paint Co. 221
Stead, Arthur 228
Stearns, A. T., Lumber Co. 264
Steel Heddle Mfg. Co. ..... —
Stein, Hirsch & Co. 263
Stephenson & Co. 248
Stephenson Mfg. Co. 61
Sterling Blower & Pipe Mfg. Co. 242
Sternberg, Fred., & Co. 245
Stoddard, Haserick, Richards & Co. 223
Strouse, Theodore H., & Co. 252
Stubbs, Joseph 54
Sturtevant, B. F., Co. 217
Suck, Adolph 42
Sykes, Walter F., & Co. 262
Taunton-New Bedford Copper Co. 263
Taylor, Jas. 272
Tebbetts, E. L., & Co. 66
Textile Finishing Machinery Co. Inside Front Cover
Textile Machinery Co. 26
Textile Machine Works 246
Thayer, Edward M., & Co. 262
Thurston, A. G., & Son 67
Tierney, Frank A. 252
Tippett & Wood Outside Back Cover
Tolar & Hart 245
Tolhurst Machine Works 50
Tompkins Bros. Co. 283
Toohey, M. J., & Co. 252
Torrance Mfg. Co. 64
Underwood Typewriter Co. 227
Union Casein Co. 263
Union Special Machine Co. 267
Universal Fountain Brush Co.. 280
Univesal Winding Co. 9
Van Noorden, E., Co. 45
Walder, J. 67
Walter & Co. 277
Walther, Otto 273
Walworth Manufacturing Co. Outside Back Cover
Ward & Vandergrift 67
Wardwell Needle Co. 285
Waters, D. F. 56
Webb, C. J., & Co. 244
Weimar Bros. 241
Western Thread & Dye Works.. 257
Westinghouse Electric & Mfg. Co. 227
Whiteley, Wm., & Sons, Ltd. ... 40
Whitin Machine Works 6
Whitinsville Spinning Ring Co. 57
Whiton, D. E., Machine Co. 64
Wildman Mfg. Co. 268
Willcox & Gibbs Sewing Machine Co. 277
Wilson & Co., Barnsley, Ltd.... 48
Woolford, G., Wood Tank Mfg. Co. 264
Woonsocket Mach. & Press Co. 18
Wright, Robt. A. 229
Yale & Towne Mfg. Co. 49
Yeomans & Ironside 230
Zurn, O. F., Co. 265

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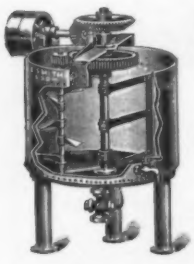

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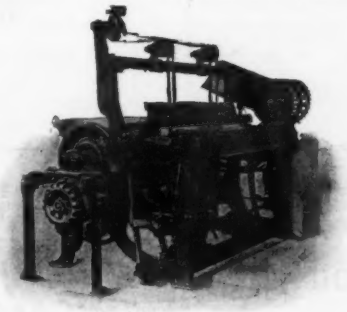

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Overseer of Cotton Weaving. Position wanted by a man 32 years of age, American, married. Worked on fancy box work, colored, light and heavy, plain and dobby work. Familiar with all kinds of looms. Has had a broad experience in starting new machinery. Good references. 3895, Textile World Record, Boston.

Master Mechanic. Position wanted by a man 29 years of age, American, married. Has worked in large machine shops and held position as foreman in tool department and understands all duties connected with a master mechanic's position. Good references. 3921, Textile World Record, Boston.

Overseer of Dyeing. Position wanted by a man 36 years of age. Worked on all kinds of woolen goods, raw stock, piece dyes and yarns. Good references. Could take a position at once, on account of the mill being closed. 3955 Textile World Record.

Boss Dyer in Knitting Mill. Position wanted by a man 53 years of age, American. Worked on shirts, drawers, cotton and wool, both in roll and garment. Familiar with all kinds of machinery. Will not go West, South or Canada. Good references. 3985 Textile World Record.

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SITUATIONS WANTED.

The following advertisements are a portion of those of superintendents and overseers, of whom full particulars are on file at this office. Manufacturers who may be in need of such men may address them in care of Textile World Record, Boston, or state their requirments directly, and the addresses of suitable men will be furnished without charge.

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Manager, superintendent or designer. Age 30; English; married. Experienced in England and in this country. Mohairs, all classes of worsted suitings, plain and fancy dress goods. 3184, Textile World Record.

Superintendent of a Woolen Mill. Position wanted by a man 40 years of age, American, married. Worked on kerseys, thibets, meltons, cheviots, cassimeres and government goods. Familiar with all kinds of stock. First-class reference. 3771, Textile World Record, Boston.

Superintendent and Designer, or assistant superintendent or boss weaver in a woolen mill. Position wanted by a man 36 years of age, American, married. Worked on all kinds of woolen and worsted goods, also blankets. Understands all kinds of machinery, has worked in all departments of a mill. Good referencees. 3845, Textile World Record, Boston.

Superintendent and Designer in a woolen mill. Position wanted by a man, 39 years of age, single. Has worked on men's suitings, overcoatings, box cloth, cheviots, covert mixes made from wool, cotton and shoddy. First-class recommendations. 3871, Textile World Record.

Manager or Superintendent of a woolen mill. Position wanted by a man, 50 years of age, Scotch, married. Worked on woolen and worsted goods, men's and women's wear, beavers, face finished goods. Twelve years as manager in his present position. Will be open for engagement about April 1st. 3862, Textile World Record, Boston.

Superintendent of a Worsted Yarn Mill or overseer of drawing, spinning and twisting. Position wanted by a man, 32 years of age, Scotch, married. Worked on wool from 1/4 blood up to fine domestic and Australian wools to all counts. Familiar with Prince, Smith, Lowell, Taylor, Wardsworth, Fayles & Jenks, Foster, Collins Bros.' machinery. Good references. 3847, Textile World Record, Boston.

Assistant Superintendent. Worked on woolens and worsteds of all kinds. Graduate of a Textile School. American; 23 years of age; single. 3228, Textile World Record.

Superintendent of a Worsted Yarn Mill. Position wanted by a man, 38 years of age, American, married. Worked on all kinds of yarns, Bradford system. Is recommended by leading mills. 3855, Textile World Record, Boston.

Agent, or Supt. and Designer. Position wanted by a man 40 years of age, married and American. Is experienced on fancy worsteds, woolen kerseys, thibets, overcoatings and dress goods. Is familiar with all kinds of woolen machinery. Good references. 3574, Textile World Record.

Superintendent of small woolen mill. Piece dyed goods, thibets, Venetians, meltons, etc. 3114, Textile World Record.

Superintendent or overseer of carding in a large mill. Worked on sheetings, ginghams. Will not go West. Familiar with all kinds of cotton machinery. 41 years of age; American; first-class references. 2021, Textile World Record.

Superintendent of bleaching and finishing cotton goods. Worked on all kinds of cheese cloth, buttercloth, sheetings, quilts, cambrics, long cloth, ducks and drills. Age 31; English; married. 3218, Textile World Record, Boston, Mass.

COTTON SUPERINTENDENTS.

Superintendent or Assistant Superintendent. Overseer of Ring Spinning Cotton Mill. Position wanted by a man 30 years of age, single; has had a number of years' experience in different departments, a graduate of a well known textile school, understands different makes of machinery, good reference as to character and ability. 4047 Textile World Record, Boston.

Superintendent of a Print Works, bleach or dye works is open for engagement. Has worked on all kinds of cotton goods and finished, printed, bleached and dyed all classes of goods from ducks to fine lawns. Would like to communicate with manufacturers in the South in establishing a plant of this kind; good references. 4041 Textile World Record, Boston.

Supt. or Asst. Supt. Position wanted by a man 38 years of age, married. Has worked on fancy cotton goods, lenos, broad silks, ribbons, hat-bands, cotton-back satins, pongees, etc. Is familiar with all looms, and all machines used in silk mills. Good references. 3560, Textile World Record.

Superintendent Small Yarn Mill. American, 25 years of age; worked on carded yarns, 8s to 60s, American cotton, white goods only. Also on all makes American machinery. Would accept position as carder, weaver or designer, where there was a chance for advancement. 3392, Textile World Record, Boston.

Superintendent of a Cotton, Cloth or Yarn Mill. Position wanted by a man, 39 years of age, American, married. Is familiar with cotton hosiery and warp yarns, single or two-ply. Is at present employed as superintendent of a cotton yarn mill, but wishes to change for advancement. Strictly temperate and industrious and can furnish the very best of references. 3853, Textile World Record, Boston.

Supt., Asst. Supt., or Overseer of Carding. Position wanted by a man 39 years of age, married, American. Is experienced on all kinds of cotton colored goods, long or short stock, also on bleached stock. Is familiar with Colvin, Whitin and Crompton looms, and all makes of carding and spinning machinery. Good references. 3585, Textile World Record.

Superintendent of cotton or woolen yarn mill or shoddy plant. Position wanted by a man 50 years of age, who has had a wide experience in the manufacture of yarns. Understands all makes of cotton and woolen machinery, also held position as superintendent in large knitting mills, and is familiar with the American makes of knitting machines. First-class recommendations. 3249, Textile World Record, Boston, Mass.

Superintendent of a bleachery or print works or assistant superintendent. Position wanted by a man, 38 years of age, an American, married. Worked on all kinds of cotton piece goods. Familiar with all kinds of machinery used in handling these goods. Now employed. First class recommendations. 3724, Textile World Record, Boston, Mass.

WOOLEN SPINNERS.

Overseer Woolen Spinning. Position wanted by a man 45 years of age, married, worked on woolen goods made of wool shoddy and cotton mixes; good references; take position at short notice. 4044. Textile World Record, Boston.

Second Hand in a Woolen Spinning Room. Position wanted by a young man 30 years of age, single, has had a number of years' experience as spinner and has been allowed to fix his own machines. Would like to get a position as second hand where he could learn to fix mules under a good man. He is familiar with D. & F. or J. & B. machines, and wants a position in the West or Middle West. 3707, Textile World Record.

Overseer of Woolen Spinning. Position wanted by a man 40 years of age, widower, worked on all kinds of yarns, wool, cotton and shoddy mixed. Familiar with the J. & B. and D. & F. machines. First class recommendations. 3720, Textile World Record.

Overseer of Woolen Spinning. Position wanted by a man, 55 years of age, American, married. Familiar with J. & B. mules. Good reference. 3797. Textile World Record, Boston, Mass.

Overseer of Woolen Spinning. Position wanted by a man 48 years of age, married, English. Worked on all kind of yarns, wool, cotton and shoddy mix, on D. & F., J. & B., Platt, Curtis & Kent mules. Good references from first-class mills. Would prefer a position in middle west. 3499, Textile World Record, Boston, Mass.

Overseer of Spinning. Position wanted by a man 30 years of age; English. Has worked all kinds of stock, cotton, wool and shoddy, from 5/8 run to 13 and is familiar with Davis & Furber mules and operators. Good references. 3595, Textile World Record, Boston, Mass.

Overseer of Spinning. Position wanted by a man 37 years of age; married and American. Has worked on all kinds of wool, cotton and shoddy mixes. Is familiar with Davis & Furber and Johnson & Bassett spinning machinery and operators. Good references. 3603, Textile World Record, Boston, Mass.

Overseer of Spinning, twisting, spooling and reeling. Position wanted by a man 28 years of age, married and American. Has worked on army and navy goods, fine and heavy woolen and merino yarns, fine worsteds, and low stock shoddy and cotton mixes. Is familiar with Davis & Furber, James Smith, Whiteley, English Bridesburgh, and Platt mules. Would prefer a position near Philadelphia. Good references. 3517, Textile World Record, Boston, Mass.

WOOLEN WEAVERS.

Overseer of Weaving. Position wanted by a man 40 years of age, married, English. Has worked on all kinds of woolen and worsted goods. Is familiar with Knowles and Crompton looms. Good references. 3647, Textile World Record, Boston, Mass.

Overseer of Woolen Weaving. 18 years' experience as overseer. Worked on cassimeres, cloakings, chinchillas, cheviots, beavers, meltons, shawls, also worsteds and on Crompton and Knowles looms, wants a position in the East. Good references. 3422, Textile World Record, Boston.

Overseer of Weaving, or charge of pattern room. Position wanted by a man 28 years of age, English, single. Worked on all kinds of woolen, worsted and cotton mixed goods. Familiar with Crompton & Knowles. Good references. Will go anywhere for a good position. 3919, Textile World Record, Boston.

Boss Weaver, or assistant superintendent. Position wanted by a man 30 years of age, married. Has worked on dress goods, fancy cassimeres, cotton warp, blankets, shawls and cloakings. Familiar with Crompton and Knowles looms. Will not go West, South or Canada. First class references. 3928. Textile World Record, Boston

Overseer of Weaving in a woolen mill. Position wanted by a man 37 years of age, married. Familiar with all classes of woolens, fancy worsteds, cotton worsteds, unions. Familiar with Crompton & Knowles, Crompton & Thayer, Draper automatic looms. Good references. Will not go to Canada. 3965 Textile World Record.

DYERS.

Overseer of Dyeing. Men's wear and dress goods, loose and wool, piece dyes and yarns. Good experience. 3161, Textile World Record.

and rugs, cotton and woolen warps; 19 years' experience in this country; first-class references; 47 years of age; English. 3325, Textile World Record, Boston, Mass.

Boss Dyer. Worked on cotton and wool and mixed stock, yarns and piece goods, hosiery, slubbing and raw stock; also scouring of wool; first-class recommendations; 28 years of age; single; English. 3327, Textile World Record, Boston, Mass.

Boss Dyer and Finisher. Familiar with silk, cotton, wool, underwear; also shirtings, scouring, fulling and bleaching. First-class recommendations. 928, Textile World Record, Boston, Mass.

Chemist or Overseer of Dyeing. Position wanted by a man 28 years of age, single. Familiar with all laboratory dyeing. Worked on all classes of goods, such as come up in mill work. Graduated from the Institute of Technology, Boston, Mass., and has had several years' experience as chemist. Good references. 3960 Textile World Record.

Boss Dyer. Position wanted by a man 29 years of age, married. Has worked on cotton, wool and shoddy, raw stock, piece dye, silk noiles, cotton and worsted yarns. Can show bright shade on shoddy fast fulling, acid, aniline and sulphur colors. Good references. 3914, Textile World Record, Boston.

Overseer of Dyeing in a woolen mill, or dyeing and finishing in a felt mill. Position wanted by a man 31 years of age, married. Has worked on all kinds of cotton, wool, shoddy mixes, raw stock, yarns cotton and wool, piano felts, chest protectors and hot felts. Good references. Could take position at once. Will go anywhere. 3911, Textile World Record, Boston.

Overseer of Dyeing. Or would accept a position as second hand in a mill on loose cotton and silk in order to get experience. Now employed as overseer on piece dyes, cost dyes and is familiar also with indigo dyeing. Good reference. 3936, Textile World Record.

KNITTERS.

Superintendent of an Underwear Mill would like to make change Jan. 1st. Have had experience on better grades of work, including full fashioned and Cooper rib work. "A. B. C.," Textile World Record, Boston.

Overseer of Knitting in hosiery mill. Position wanted by single man 25 years of age; worked on ladies', misses' and men's half hose on Standard B. & F., Beatty, Hepworth Standard Loopers; Murphy, Merrow sewing machines; Wildman, Brinton ribbers; good references. 4055 Textile World Record, Boston.

Superintendent or Overseer of Knitting. Worked on all kind of goods made on circular latch needle machines, also ladies' and children's cotton hose. Understands Wildman, Nye & Tredick, Scott & Williams, Champion, Mayo knitting machines; Union Special Merrow, Champion Singer, Wheeler & Wilson Standard Chauvet, Coulter, Willcox & Gibbs sewing machines; good references. 4058 Textile World Record, Boston.

Underwear Machine Fixer. Position wanted by experienced young man. Familiar with Scott & Williams, Wildman and Lamb machines. Address, "J. J.," Textile World Record, Boston.

Overseer of Knitting. Position wanted by a man 25 years of age, American. Has worked on plush, both single and double flat goods, gauges from 12 to 30 balbriggan on gauges from 20 to 30. Is familiar with presses and block wheel work and Campbell & Clute, Tompkins Bros. and Crane knitting machines. Good references. 3685, Textile World Record, Boston, Mass.

Manager or Superintendent of Knitting Mill. Position wanted by a man 45 years of age, married. Has manufactured cardigan jackets, sweaters, leggings, gloves, hunting hoods, chest protectors, hose and half hose, etc. Is familiar with flat knitting machines and latch needle gauges from 5 to 16. Good references. 3667, Textile World Record, Boston, Mass.

DESIGNERS.

Superintendent, assistant superintendent or assistant designer. Position wanted by a man 28 years of age, married, and American. Is experienced on all classes of woolen goods, and is familiar with Crompton & Knowles looms. Good references. 3591, Textile World Record, Boston, Mass.

Assistant Designer in woolen mill. Position wanted by a man 21 years of age, American, single. Worked on woolen and worsted goods. Good references. Wants New England States only. 3976 Textile World Record.

Designer and Assistant Superintendent. Position wanted by a man 43 years of age, married, English. Is experienced on all classes of goods from fine worsteds to the lowest woolens for men's wear. Fancy and plain cloakings and dress goods, linings, mercerized goods, unions. Is familiar with Crompton & Knowles looms and Johnson & Bassett and Davis & Furber mules. Good references. 3655, Textile World Record, Boston, Mass.

Designer or Overseer of weaving, or boss dresser. Position wanted by a man 24 years of age, American, married. Has worked on cotton worsted. Familiar with Crompton & Knowles looms. Good references. Could take position at once. 3913, Textile World Record, Boston.

Designer or assistant superintendent. Worked on cotton warp flannel coverts, plain and fancy cotton warp, and all wool dress goods. First-class references. 3244, Textile World Record.

Designer on any class of dress goods waistings, mantle cloths, fine shirtings, etc. 3203, Textile World Record.

Designer. Worked on ladies' dress goods, shirtings and flannels and some jacquard designing; first-class recommendations; 33 years of age; married. 3285, Textile World Record.

Designer or superintendent. Age 37; English; married. Experienced in this country and England. Worked on cloakings, suitings, coverts, broadcloths, etc. Wants $30 to $40 per week. Mill closed, and wants place at once. Good references. 3140, Textile World Record.

FINISHERS.

Overseer of Finishing in a woolen mill. Position wanted by a man 34 years of age, married, American. Familiar with cassimeres, meltons, thibets, kerseys, worsteds, cloakings, cotton worsteds and all kinds of cotton warp goods. Good references. Familiar with all kinds of finishing machinery. 3958 Textile World Record.

Overseer of Woolen Finishing. Position wanted by a man 26 years of age, single. Worked on kerseys, beavers, broadcloths, meltons, cotton worsteds, men's wear and dress goods. Familiar with all kinds of finishing machinery. Good references. 3954 Textile World Record.

Overseer of Finishing, cutting or seaming department in a knitting mill, or assistant superintendent. Position wanted by a man 42 years of age, married. Worked on flat Balbriggan and fleece lined underwear. Good references. Will not go West, South or Canada. 3966 Textile World Record.

Overseer of Finishing in a woolen mill. Position wanted by a man 37 years of age, married, Swede. Has worked on fancy cassimeres, thibets, woolen goods of all kinds, also union cassimeres. Familiar with all kinds of finishing machines. Good references. 3898, Textile World Record, Boston.

Overseer of Woolen Finishing. Position wanted by married man 30 years of age; worked on cheviots, dress goods, all grades of worsteds, overcoatings, suitings. 4048 Textile World Record, Boston.

Overseer of Finishing in a woolen mill. Position wanted by a man 35 years of age, married, American. Worked on all classes of woolen and worsted goods, from highest to lowest grades. Familiar with all kinds of machines. Will not go West, South, Canada, Maine, Vermont, Pennsylvania. Good references. 4026 Textile World Record.

WOOLEN CARDERS.

Overseer of Carding. Position wanted by a man 34 years of age, married. Has worked on all wool, wool cotton and shoddy mixes, cassimeres, kerseys, cheviots, cloakings, etc. Is familiar with all makes of American cards. Good references. 3562, Textile World Record, Boston, Mass.

Overseer of Woolen Carding. Position wanted by a man, 39 years of age, married, American. Has worked on wool, shoddy and cotton mixed goods, dress goods, kerseys, overcoatings, cassimeres, etc. Familiar with D. & F. carding machinery. Good reference. 1766, Textile World Record, Boston.

Overseer of Woolen Carding. Position wanted by a man, 33 years of age, married, American. Worked on all kinds of cotton, shoddy and wool mixed goods. Familiar with all kinds of woolen carding machinery. Will not go west, south or Canada. Could take a position at short notice. Good reference. 3774, Textile World Record, Boston.

Overseer Woolen Carding. Position wanted by man 36 years of age, married; worked on woolen goods of most all kinds on Cleveland, Furbush, Smith, Davis & Furber, Plat, Goldie & McCulloch bark condensers; good references. 4045 Textile World Record, Boston.

Overseer of Carding. Position wanted by a man 57 years of age, married, American. Has worked on all kinds of woolen goods, and is familiar with all makes of American and English carding machinery. Has first-class recommendations. 3525, Textile World Record, Boston, Mass.

Overseer of Woolen Carding or second hand in large mill. Worked on all wool shoddy and cotton mix, silk noil goods. 43 years of age; married; good references. One worker in family for finishing room. 3444, Textile World Record.

Boss Carder in a woolen mill. Worked on all wools, cotton and shoddy mixes, and is familiar with Davis & Furber and Cleveland cards, and all makes of rub aprons and different rub rolls. 29 years of age; American; first-class references. 2284, Textile World Record.

Overseer of Carding.. Position wanted by a man 35 years of age, American. Has worked on all wool, cotton and shoddy mix goods, and is familiar with Lombard, Davis & Furber and Smith carding machinery. Good references. 3661, Textile World Record, Boston, Mass.

Overseer of Woolen Carding, or Carder and Spinner. Position wanted by a man 36 years of age, married, worked on all kinds of stock, wool shoddy, cotton, mixed goods, understand all makes of cards and J. & B., D. & F. mules. Good reference; will not go to Maine, Pennsylvania, West, South or Canada. 4037, Textile World Record, Boston.

Overseer of Woolen Carding. Position wanted by man 46 years of age, widower, worked on all kinds of woolen goods and on all kind of stock, wool, cotton and shoddy mixes. Good reference from four leading mills where employed, could take position at once as mill where last employed have stopped carding. 4039, Textile World Record, Boston.

Overseer of Weaving in a Woolen Mill. Position wanted by a man 42 years of age, married, American. Worked on cotton, worsteds, woolens, dress goods and fancy worsteds. Familiar with Crompton & Knowles looms. Will not go west, south or Canada. Good references. 4035, Textile World Record, Boston.

Overseer of Woolen Carding. Position wanted by a man 47 years of age, married. Worked on woolens and knit goods, both fine and coarse, and all makes of cards. Good reference from mills where he has been employed. 3535, Textile World Record, Boston, Mass.

Overseer of Woolen Carding. Position wanted by a man 56 years of age; married; American. Is experienced on all kinds of stock and is familiar with any make of carding machinery. Good references. 3608, Textile World Record, Boston, Mass.

Overseer of Woolen or worsted carding. Would accept a position as superintendent of a felt mill. Understand the business in every detail. Worked on all kinds of stock and all makes of cards. First class reference. Will go any place for a good position. 45 years of age. American, married. 3470, Textile World Record, Boston.

COTTON SPINNERS.

Overseer of Ring Spinning, spooling and warping in a cotton mill. Position wanted by a man 42 years of age, married, American. Worked on prints, ginghams, hosiery yarns, denims, thread and lace yarns. Familiar with Whitin, Lowell, Howard & Bullard, Fales & Jenckes and Biddeford machines. Will not go West, South or Canada. Good references. 4030 Textile World Record.

Overseer of Ring Spinning, spooling and warping. Worked on all classes of goods, hosiery yarns, long and short staples from 8s up. Familiar with Sayles & Jenks, Mason, Lowell, Whiting and Saco & Pettee machinery. First-class references 28 years of age; married. 3308, Textile World Record.

Overseer of Cotton Spinning, 25 years of age, with experience on heavy and medium white and colored goods, 5s to 60s. Denims, chambrays, awnings, napped goods, fine shirtings, etc. Worked on all American ring spinning frames, Draper spoolers and warpers, also twisters and on ball or chain and beam. 3420, Textile World Record.

Overseer of Cotton Spinning. Englishman with experience on mule and frame spinning; worked on 3 1/2 to 200s filling, and on all kinds of novelty yarns, white or colored; accustomed to all machinery used in this work; wants a position in the States. 3437, Textile World Record.

Overseer of Mule and ring spinning. Position wanted by a man 35 years of age, married and American. Has worked on cotton yarns from 20s to 120s and is familiar with Parr, Asa Lees, Hetherington, Dobson & Barlow, and Mason new rope mules, and ring frames. Good references. 3515 Textile World Record, Boston, Mass.

Overseer of Spinning in a cotton mill, or superintendent of a small yarn mill. Position wanted by a man 33 years of age, married, English. Worked on yarns from 40s to 150s. Familiar with all kinds of machines. Good references. 4016 Textile World Record.

MISCELLANEOUS.

Assistant Superintendent, or Boss Weaver in a Woolen Mill. Position wanted by a married man, 28 years of age. Worked on all kinds of woolen goods, including cassimeres, suitings, dress goods, kerseys, thibets, meltons. Understands the Crompton & Knowles looms, has had experience in the carding and spinning room. A graduate of the International Correspondence School. Good reference. 4043, Textile World Record, Boston.

Assistant Superintendent, or Assistant Designer in a large woolen mill, or Assistant Superintendent and Designer in a medium sized woolen mill. Position wanted by a man 38 years of age, American, single. Worked on tourists' coatings, shirtings, dress goods, broadcloths, kerseys, etc. Good references. 4034, Textile World Record, Boston.

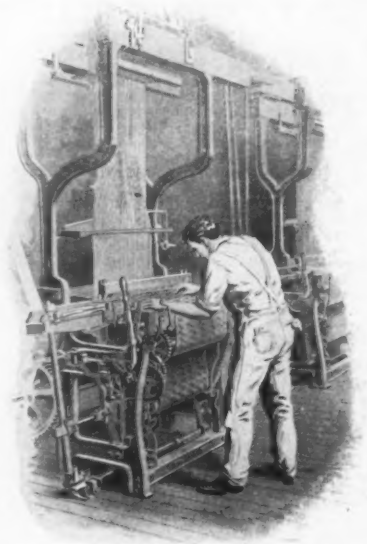
Boss Dyer in a Woolen Mill. Position wanted by a man 23 years of age, married, American. Worked on worsteds and woolens, raw stock, skein and piece goods. Familiar with Klauder & Weldon machines for yarn. Will not go South. Good references. 4036 Textile World Record, Boston.

Wanted. Position as bookkeeper or traveling salesman by man of experience, would invest $2000 to $2500 with a good firm with a position after both parties were satisfied, middle age man, married, of good habits, with good reference. 3472, Textile World Record, Boston.

Overseer of London Shrinking Department. Position wanted by a man 33 years of age, single, and has had 13 years experience with the English method of shrinking. Familiar with Crawford Hydraulic Presses, also Curtis & Marble. Good references. 3963, Textile World Record, Boston.

Overseer of Dressing, Spooling and Twisting. Position wanted by married man, 38 years of age, worked on all kinds of woolen goods, worsteds, dress goods. Good reference. 4042, Textile World Record, Boston.

Weavers Become Designers



Weavers and loomfixers can become designers, and other textile workers can qualify for overseers' and superintendents' positions by obtaining a thorough technical textile education in their spare moments without leaving home or their present employment.

Modern manufacturing conditions are such that the untrained textile worker has little or no chance for advancement. To win success, promotion, and increase your remuneration you must study—others are studying and unless you do, they will most surely outstrip you.

Are you competent

to be a designer, a superintendent or an overseer? Put the question to yourself fairly and squarely and answer it honestly. Had you not better study and prepare yourself for filling a responsible position and increasing your salary?

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That sounds remarkable, but we have raised thousands of salaries. We can raise yours too if you will not stand in th path of your own progress. Remember, you must have technical training to keep abreast of modern methods. Won't you write today for information as to how we can raise your salary, stating the particular line of textile manufacturing in which you are interested? Do it now — others are advancing, while you are standing still. Address

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International Correspondence Schools
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COTTON WEAVERS.

Overseer of Cotton Weaving. Worked on lenos, checks, plaids, fancy stripes, drop box and plain looms. First-class references. Will not go West or to Canada. Age 36, English. First-class references. 1855, Textile World Record.

Overseer of Weaving. Englishman; 33 years of age; married; worked on fine lawns, sheetings, sateens and fancies, coarse drills, twills, bicycle cloth, automobile cloth for tires. Familiar with Whitin, Crompton, Knowles, Mason, Kilburn & Lincoln and Lowell machines. 3073, Textile World Record.

Loom Fixer or second hand in weave room. Worked on all kinds of mixed goods, cotton and woolen dress goods, fine lenos, Jacquard and drop box looms. Age 33; French; good references. 3265, Textile World Record.

Overseer of Weaving or loom fixing. Worked on cotton, woolen, silk. Used to Crompton & Knowles looms, both box and plan, Lewiston looms, Mason, Colvin, Whiting, Patterson, etc. Age 43; Scotch; married. 3216, Textile World Record.

Overseer of Weaving or designer. Lawns, sheetings, twills, sateens, quilts, bedford cords, lappets. A young man; unmarried. Good experience and first-class recommendation. 3068, Textile World Record.

Overseer of Weaving. Worked on sheetings, twills, sateens and fancies. Wants not less than $18 per week. 3157, Textile World Record.

Overseer of Cotton Weaving. Position wanted by a man, 27 years of age, American, married, with experience on prints, cambrics, sateens, drills, corded goods, etc. Worked on Draper, Whitin, Lowell, Mason and Colvin looms. Prefers a position in the East. 3430, Textile World Record, Boston, Mass.

Overseer of Weaving in Cotton Mill, or second hand with a chance for promotion. Position wanted by a man 39 years of age, married, American. Has worked on drilling, duck cloth, sheeting, crash bags, sateens, fancy ginghams and staple goods. Familiar with Crompton, Whitin, Draper, Thomas Butler, Lowell looms. Will not go West, South, Canada or to New York. Good references. 3992 Textile World Record.

COTTON CARDERS.

Overseer of Cotton Carding in a large mill or carder and spinner in a small mill. Position wanted by a man, 35 years of age, American, married. Worked on white and colored work, both fine and coarse numbers. Familiar with all kinds of carding machinery. Good reference. 3784, Textile World Record, Boston, Mass.

Overseer of Carding in cotton mill. Position wanted by a man 39 years of age, single. Worked on all kinds of cotton goods, Sea Island, combed and carded, from 24s up to 150s. Familiar with American and English carding machinery. Good references. 3941, Textile World Record.

Overseer of Carding in cotton mill. Position wanted by a man 28 years of age, married. Familiar with white and colored numbers up to 16 H. K. Familiar with the following makes of machines: Platt, Mason, Whitin, Lowell, Providence, Kitson and Atherton. Good references. Will not go to Pa., N. J., Western or Southern States, or to Canada. 3951, Textile World Record.

Overseer Ring and Mule Spinning. Position wanted by a man, 45 years of age, married, English. Worked on all kinds of cotton, both fine, coarse from 1s to 200s. All kinds of cotton spinning machinery. Good references. 3850, Textile World Record, Boston.

Overseer of Carding or Spinning in a cotton mill. Position wanted by a man 39 years of age, married, American. Worked on white and colored goods. Familiar with Whitin and Lowell machines. Will not go to Canada, New York, New Jersey or New England States. Good references. 3997 Textile World Record.

Overseer of Carding, or Second Hand in a large mill. Position wanted by a man 36 years of age, married, English, worked on all kinds of yarns—both plain and novelty, shirtings, sheetings and print. Familiar with Saco and Pettee cards and speeders, Lowell, Woonsocket frames, American and English carding machinery. 3696, Textile World Record.

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That WYANDOTTE TEXTILE SODA does not in the least degree injure the wool fiber, but that it does free it from all objectionable matter and leaves it in prime condition for spinning, weaving or dyeing is not a matter of conjecture or hearsay, but an actual fact.

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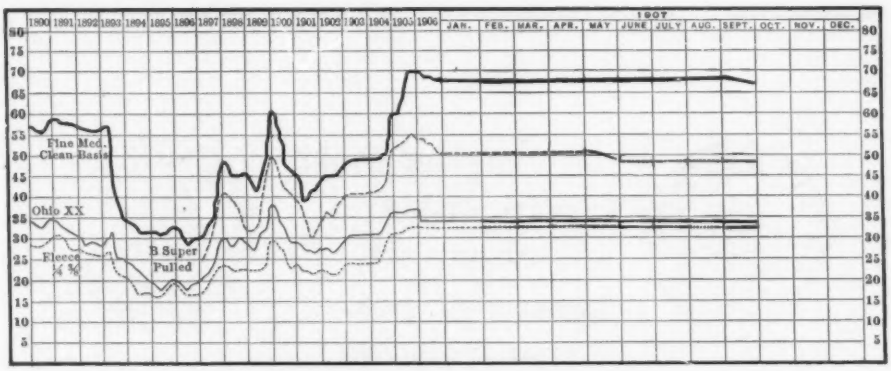

CHART SHOWING RANGES IN THE PRICE OF WOOL TO DATE.

The Wool Market.

The large mills have been buying wool freely and since our last report a considerable part of the new clip has passed to the possession of the spinners. Prices have been in the buyers' favor. This has been due to the desire of dealers to lighten the financial burden of carrying the stock of wool. This transfer of a large portion of the load to the shoulders of the manufacturers has strengthened the market situation, and reduced the chances of a break in prices. The fact that the best buyers of wool have been buying freely is proof that they consider prices to be as low as they are likely to go for the present, and is a good pointer for the trade in general. There is no prospect that prices will advance materially. The advantage in buying early, however, is found in the better selection of grades.

The call has been for combing wools and the regular clothing clips have been neglected. The first signs of a return of clothing wools to favor, however, will appear in the goods market and not in the wool trade. In spite of the continual talk of the revival of the woolen, cassimere and cheviot, the trend continues toward the smooth finish of the all worsted and cotton worsted fabrics. The woolen mills have had a poor season and a large part of their carding and spinning machinery is idle. Until this condition is changed clothing wools will lag behind in the wool market.

*Michigan, Detroit. It is reported that the Pioneer Woolen Co., which suspended operations owing to difficulties with the stockholders, will resume under management of Chas. E. Scotney, who has been appointed receiver.

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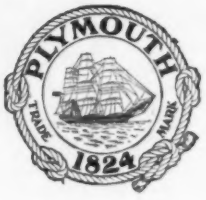

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At 2-5 the cost for installation as compared with leather belting, rope drives are far more effective, safer, transmit large or small horse power in any direction, provide for future growth and greatly lessen maintenance expense.

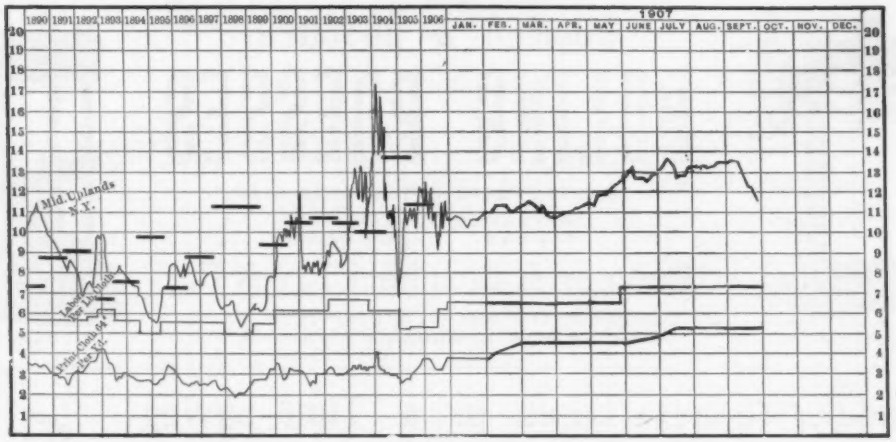
Plymouth Rope Drives by their absence of slip, steadiness, freedom from electrical disturbances, great durability and low cost make the ideal drive for textile mills.

Put your transmission problems up to us. Our long experience in manufacturing, installing and using rope drives is at your service.

Send for our booklet on "Rope Driving."

Plymouth Cordage Co.

No. Plymouth, Mass.



The short, heavy, horizontal lines indicate the size of the cotton crops in millions of bales.

CHART SHOWING RANGE IN THE PRICE OF COTTON TO DATE.

The Cotton Market.

Favorable prospects as to the growing crop have been accompanied by a decline of prices in both the spot and future markets. It is the general opinion that the decline has been helped along by the disarrangement of the Southern markets, resulting from the recent legislation against speculation. While this legislation has been directed against the worst of the speculative evils, whose elimination will be an unmixed good, it has resulted in depriving the South temporarily of many sources of market information, and encouraging a decline in prices. The underlying reason for the downward movement is of course the arrival of the new crop. With but one or two exceptions every year included in our chart has brought at this season a downward tendency in the cotton market. The movement into sight since Sept. 1 has been less than for any of the past six years, the figures as compiled by the Chronicle being as follows:

1907, Sept. 27	768,892 bales
1906, Sept. 28	956,705 bales
1905, Sept. 29	1,246,910 bales
1904, Sept. 30	1,373,847 bales
1903, Oct. 2	902,902 bales
1902, Oct. 3	1,458,440 bales

The same authority estimates the world's visible stock on Sept. 28 at 2,318,250 bales, as compared with 1,970,746 bales in 1906, 2,928,939 bales in 1905, and 1,828,211 bales in 1904.

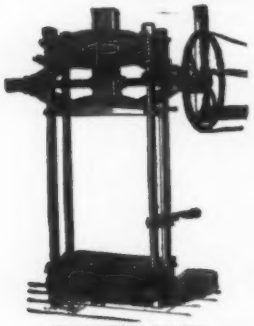
Guarding Trade Secrets.

Consul-General Richard Guenther sends the following report from Frankfort on the restrictive law in Germany covering competition among factories:

"An Austrian merchant was recently convicted in the criminal court at Konstanz, Germany, of having violated the law against illicit competition. He was sentenced to imprisonment for three months. This foreign merchant, who intended to establish in Austria a factory for preserving vegetables, had come to Singen and approached the employe of a similar factory there, trying to induce him to reveal the business methods, technical appliances and manner of production in vogue in the establishment; also where the supplies in raw materials were obtained and the names of the customers of the factory. He offered money gratuities to the employe, who was a sort of foreman, and promised him a better-paying position in his factory in Austria.

"Some of our American manufacturers are very enterprising and occasionally—when in Europe—seek to obtain information by personal efforts. The case cited may be useful in cautioning personal investigators to be very circumspect, so as not to violate existing laws in foreign countries."

WEIMAR BROS.
MANUFACTURERS OF
Cotton Mercerized Tapes,
SPOOL TAPES, BINDINGS AND NARROW FABRICS FOR UNDERWEAR AND OTHER TRADES.
Phone Connections.
Works, 2046-48 Amber Street, PHILADELPHIA, PA.



KNUCKLE JOINT.

BOOMER & BOSCHERT

BALING PRESSES

ARE THE STANDARD

Hydraulic or Knuckle Joint
Any Size .. Any Power

Boomer & Boschert Press Co.

338 West Water S., SYRACUSE, N. Y.
Southern Agent, A. H. WASHBURN, Charlotte, N. C.

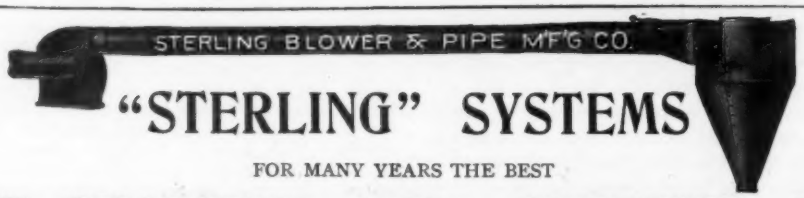
HYDRAULIC.

Handles heavy cases in a Time-Saving Way—The Economy Steel Tiering Machine

Goods are put in place with ease and economy. The largest amount of stock can be stored in the smallest possible space and yet be instantly accessible. In use in representative mills. Investigate its merits and 'twill be in use in yours. Write for prices.

Economy Engineering Co.

58-64 N. Jefferson St.
Chicago, Ill.



"STERLING" SYSTEMS

FOR MANY YEARS THE BEST

DUST COLLECTING, WOOL CONVEYING, ETC.

STERLING BLOWER & PIPE MFG. CO.

Write for "1907" Catalog.

HARTFORD, CONN., 1027 Huyshope Ave. New York Office, 109 Liberty St.

For **25 YEARS** We have held OUR REPUTATION as Progressive Manufacturers. Do not forget this when ordering GAGES.

ORIGINAL SINGLE BELL CHIME WHISTLE
Harmonious
Far Reaching
Pleasing.

A Truthful Gage is the only GOOD GAGE.

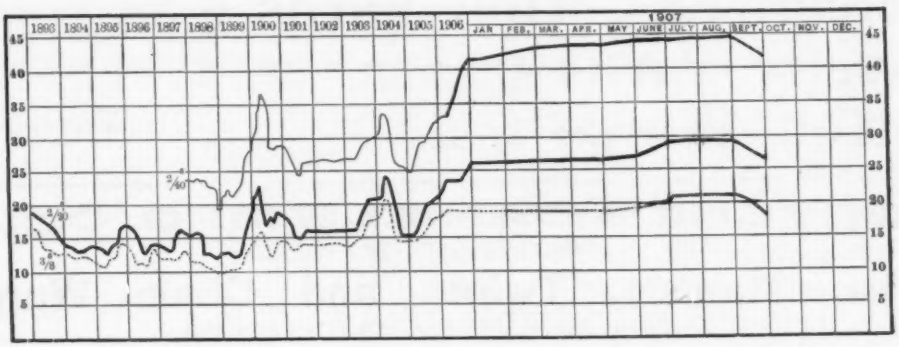
This Company manufactures, besides the above a large variety of articles used in connection with steam engines and boilers, all of which are standard quality, and may be relied upon. *Send for Catalogue.*

CROSBY STEAM GAGE & VALVE CO.

Stores: BOSTON, NEW YORK, CHICAGO, LONDON.

Office and Works:
BOSTON, MASS.

Yarn Department.



GRAPHIC CHART SHOWING RANGE OF PRICE OF COTTON YARN TO DATE.

The Cotton Yarn Market.

The decline in the raw cotton market and the changed sentiment in business circles generally have brought about a decline in the prices for cotton yarn and changed a seller's market to a market that belongs in large measure to the buyer. Weavers and knitters are no longer worrying regarding the source of their yarn supply. There are too many clouds hovering around the horizon in the goods trade for them to worry about where to buy. They are recalling the years when the difficulty was to sell goods and are wondering whether a presidential year is to witness a return of those conditions.

Cotton yarn spinners are talking of curtailing production, but this it not taken seriously. In spite of the present depression the fact remains that many of the yarn mills have their product well sold ahead and have no occasion to worry about the immediate future. We quote as follows:

Eastern Cops.

6s	22
8s	22½
10s	23
14s	24
16s	24½
18s	25½
20s	26
22s	26½
24s	27½
26s	28½
30s	30
34s	33
36s	35
40s	39

On cones, ¾c. more up to 14s; 1c. more from 15s to 22s; 1½c. from 23s to 35s, and 2c. above that.

Eastern Two-Ply Skeins, Carded Peeler.

12s	24½
14s	25
18s	26½
20s	27
24s	30
26s	31
30s	35
36s	39
40s	44
45s	49
50s	54
55s	58
60s	63

Eastern Two-Ply Warps, Carded Peeler.

2/30s	35
2/36s	39
2/40s	44
2/45s	49
2/50s	54
2/60s	64

Egyptian Weaving Yarns.
Single Skeins Combed.

30s	48
36s	50
40s	52
45s	55
50s	59
55s	62
60s	69
70s	75

North Carolina, Whitney. It is rumored that a cotton mill will be built at this place. Richard A. Eames, Jr., of Salisbury is interested.

THE J. R. MONTGOMERY CO.,

Windsor Locks, Conn.

MANUFACTURERS OF

Mercerized Cotton Yarns Gives the High Silk-Like Lustre in Knit Goods and Woven Fabrics.

Novelty Yarns Boucle, Bourette and Spirals, in Cotton, Wool, Worsted, Mohair and Silk.

Cotton Warps on Beams, Jack Spools and Tubes. In Fancy, Twist, Colors and Printed.

GREENE & DANIELS MFG. CO.,

COMBED, CARDED AND GASSED

Yarns, Threads, Twines and Chain Warps.

DYE SULPHUR BLACKS DIRECT IN COPS, CONES OR TUBES.

Colored and Bleached Yarns Furnished in any manner desired by the trade.

Pawtucket, R. I.

MONUMENT MILLS,

Manufacturers of

White, Colored, Fancy and Double Twist

COTTON WARPS

HOUSATONIC, MASS. **4s to 60s.**

WOOL NOILS WASTE

COTTON YARNS

Members of the National Association of Cotton Manufacturers and the Delegates to the International Cotton Conference, when in Philadelphia, the largest textile manufacturing centre in this country, are invited to call at the largest Commission House in this vicinity.

Don't forget the address,

116-118 CHESTNUT STREET, PHILADELPHIA

The Philadelphia Yarn Market.

Prices on cotton yarn have declined steadily the past few weeks in sympathy with the decline in cotton, also on account of a slackening in the demand for yarn. Business has been quiet, and we have had altogether a buyers' market. Yarn in most numbers can be had for prompt delivery either from stock or from the mill. This has a tendency to restrict buying, as customers buy in small lots when they find it is not necessary to order ahead to secure their deliveries.

Business on weaving yarn has been particularly dull, and the decline in prices has affected two-ply weaving yarn more than knitting yarn. This readjustment of price had to come, as yarn was selling on too high a basis.

We rather expect to see the market steady around the present level, unless there should be some sharp break in cotton.

Prices today are as follows:

Southern frame spun cones:—

7s and coarser	21½
8s and 9s	21¼
10s	21½
12s	22
14s	22½
16s	23
18s	24
20s	24½
22s	25½
24s	26
26s	27
30s	28
40s	41
50s	54

Southern high grade mule yarn:—

Cones.

10s	23½
12s	24
14s	24½
16s	25½
18s	26½
20s and 22s	27-27½
24s	28

Southern frame yarn, lower grades:—

6s and 8s	20½
10s	21

Eastern cones (high grade quality):—

10s	24
12s	24½
14s	25
16s	26
18s	27
20s and 22s	27½-28

Skein yarn (mostly Southern):—

4s and 8s soft	18½
10s and 12s	19½-20

JAMES E. MITCHELL CO., COMMISSION MERCHANTS.
Cotton Yarns
AND COTTON CLOTHS.
122-124 Chestnut Street, PHILADELPHIA, PA.
73 Leonard Street, NEW YORK.
Brown Building, 185 Summer Street, BOSTON, MASS.
25 South Tryon Street, CHARLOTTE, N. C.

CATLIN & CO.,
Cotton Yarns
345 Broadway, NEW YORK.
67 Chauncy Street, BOSTON.
206 Chestnut Street, PHILADELPHIA.
605 Medinah Temple, CHICAGO.

Harding, Whitman & Co.,
Dry Goods Commission Merchants,
COTTON AND WORSTED YARNS.
BOSTON. NEW YORK. PHILA.
CHICAGO. BALTIMORE. ST. LOUIS.

A. D. Salkeld & Bro.
COMMISSION MERCHANTS
DEP'T. FRED'K VIETOR & ACHELIS
COTTON YARNS
66-72 LEONARD STREET - - NEW YORK

J. R. TOLAR
J. H. HART
J. R. TOLAR, JR.
P. G. HART
TOLAR & HART
Cotton Yarns and Cotton
TEXTILE BUILDING
Members of New York Cotton Exchange
66-72 LEONARD ST. NEW YORK

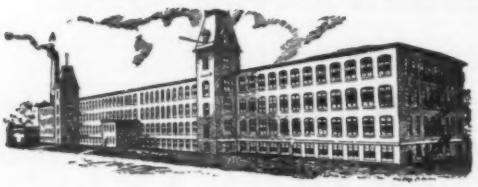
Fred Sternberg & Co.
530 Broadway, - NEW YORK.
MERCERIZED TURKEY RED GASSED } COTTON YARNS.

E. D. LORIMER & CO.
COTTON YARNS
MERCERIZED YARNS } ALL NUMBERS FOR ALL PURPOSES
346 BROADWAY, NEW YORK.

LUDWIG LITTAUER,
Successor to MOELLER & LITTAUER.
SILK, WORSTED, WOOLEN YARNS COTTON AND MOHAIR
Polished Threads and Tinsel. Artificial or Wood Silk.
Mercerized, Turkey Red, Fine Gassed Yarns.
109 GREENE ST., NEW YORK.

G. T. Crocker, Pres. W. F. Stiles, Treas.

ORSWELL MILLS



Fitchburg, Mass.

Capacity, 45,000 Spindles.

HIGH GRADE YARNS

From Egyptian and Peeler Cottons, Carded or Combed, in Chains and Skeins, on Balls, Beams, Spools, Cops, Cones, Tubes, Single or Twisted.

JENCKES SPINNING CO.

Main Office and Mills at Pawtucket, Rhode Island.

Carded and Combed Cotton Yarns for Weavers and Knitters.

Double and Twist Yarns for Woolen Trade.

Philadelphia Office, Mariner and Merchant Building, Third and Chestnut Streets.

GRANT YARN CO.,

COMBED AND CARDED COTTON.

YARNS 40's and above. AND

FITCHBURG, MASS. **WARPS**

Ballou Yarn Co.

PROVIDENCE, R. I.

Harness and Seine Twines and other Job Gassing, Winding, etc. All Numbers

GASSED YARN SPECIALTIES

Reels for Cotton WOOLEN AND WORSTED

Patented Hosiery Winders, Cop Winders and Spoolers.

LINDSAY, HYDE & CO.,

2124 to 2130 East York St., PHILADELPHIA, PA.

EDDY & STREET,

Cotton, Woolen

Yarns and Braids

Worsted, Spun Silk.

PROVIDENCE, R. I.

WATCHMAN'S CLOCK, LATEST IMPROVED

Portable and Electric.

Controls Night Watchman.

Allowance made for old clocks.

T. NANZ & CO., 127 Duane St., N.Y.

Wm. Chalmers & Co.

(Incorporated)

Imported and Domestic Cotton Yarns.

Turkey Red Yarns a specialty.

Correspondence solicited.

43 Leonard St. - - NEW YORK.

Scranton Yarn Finishing Co.

SCRANTON, PA.

Dyers of Skein Silk, Pure Dye and Weighted.

Mercerizers, Dyers and Coners.

THE RAVINE MILLS CO.

MANUFACTURERS OF

COTTON WARPS

In White and Colors on Beams and Jackspools

Specialty of Fast Black Twist on Jackspools.

VERNON, CONN.

C. M. BLAISDELL, Pres. and Treas. G. A. BLAISDELL, Vice-Pres. and Sec'y.

Established 1860—Incorporated 1893.

THE S. BLAISDELL, JR., CO.,

COTTON, EGYPTIAN PERUVIAN

American Long Staple a Specialty. Shipments direct to mill from Egypt, Peru and all American Southern Points.

CHICOPEE, MASS.

Cotton Waste Purchased on Yearly Contract from Mills.

TEXTILE MACHINE WORKS

THUN & JANSSEN, READING, PA.

Manfrs of *BRAIDING MACHINES*

for making Dress Trimming Braids, Cotton Tapes, Underwear Braids, Shoe Laces, Spindle Banding, etc. Winders, Doublers. Measuring Machines, Reelers, Singeing and Finishing Machinery. Special Machinery.

NEW AND SECOND-HAND WOOLEN Machinery

GEO. L. SCHOFIELD, 123 No. Front St., PHILA., PA.

Agent for the Weston Hydro Extractor.

14s to 20s	20½-22
22s	23
14/2	20½
16/2	21½
20/2	23½
30/2	27
40/2	21
16/3 slack	20
12/3 slack	10
8/3 carpet	18½
8/3 slack	18½
9/4 slack	18½

Warps (Southern):—

10s to 12s	19½-20
14s	21
16s	21½
20s to 22s	22-23
26s	25½
14/2	22
16/2	23
20/2	23½
24/2	25
30/2	27
40/2	40

Mixed colored yarns (mock twist, half colors):—

6s to 10s	22-23
12s to 14s	23½-24
16s to 18s	25-26

Mock Egyptian, 2c. advance over white.

Egyptian, 7 to 8c. above best quality white.

Prosperity in Bavaria.

The continued prosperity of the Bavarian cotton spinning companies during the past year is well shown in a table compiled by Messrs. W. Bischoff & Co., of Bayreuth and Augsburg, summarizing the financial returns of 23 companies. The most prosperous of all, the Spinnweberei, has paid for 1906 a dividend of 28 per cent., as compared with 23 1/2 per cent. for 1905, 17 1/2 per cent. for 1904, and 23 1/3 per cent. for 1903; while at the other end of the scale the Buntweberei, which sustained losses in each of the three preceding years, was in a position to pay 3 per cent. None of the 23 companies made a loss in 1906, whereas one did so in 1905, three in 1904, and four in 1903. The average dividend-rate for the whole list is 12 per cent. for 1906, against 11 1/4 per cent. for 1905, 8 1/2 per cent. for 1904, and 7 1/2 per cent. for 1903. The average rate on the aggregate share capital would work out rather better, as the largest companies (e. g., the Spinnweberei, Stadtbach, Bamberg and Neue Spinn. Hof) have paid much more than the average rate.

LINEN YARN IMPORTER.
HUGHES FAWCETT, 115 Franklin Street, NEW YORK.
Flax, Hemp and Jute Line and Tow Yarns,
For Weaving Purposes.
Linen Jacquard Harness Twines,
Fine Cotton Harness and Heddle Twines
For Cotton, Silk, Woolen and Carpet Manufacturers.
Correspondence solicited. Samples promptly furnished.

DUNCAN & YOUNGS
95 Worth Street, NEW YORK
Practical Manufacturers of
YARNS, THREADS, TWINES, CORDS, ROPE
AND MILL SUPPLIES
Anything in the line you cannot get anywhere else apply to us.

C. MOORE & CO.,
Manufacturers of
TWINES, THREADS AND YARNS
Jacquard Harness Twines of all kinds on hand and made to order.
S. W. Cor. Fifth and Market Sts., Phila.

ATLANTIC FIBRE CO.
Luzonne Linen
can be furnished in Yarn spun to suit all requirements. It is superior to either Linen or Ramie, has a high lustre and can be either bleached or dyed readily. It is very much stronger than cotton, cheaper than linen, ramie, or best mercerized cotton.
Samples and quotations on inquiry.
Room 203 Wool Exchange Building, 260 W. Broadway, New York

Box Shook
and
Lumber
THE CONNECTICUT BOX CO.
New Haven, Conn.

The Merwin Paper Company
Hartford, Conn.
Press Papers and Fender Boards
Correspondence Solicited
Mills at Rainbow, Conn. **Address Inquiries to Rainbow, Conn.**

Pocasset Worsted Company,

WORSTED YARNS

IN THE GRAY.

Mills at
Thornton, R. I.

Office
100 Boylston St., Boston, Mass.

French System. Bradford System.

B. F. BOYER CO.,

MANUFACTURERS OF

WORSTED AND WOOLEN YARNS,

Office and Mill, River Ave. and Marlton St. CAMDEN, N. J.

Woolen and Merino YARNS

Eaton Rapids Woolen Mills,

EATON RAPIDS, MICH.

Bradford System French System

STEPHENSON & CO.

Worsted and Woolen Yarns

240 Chestnut Street
PHILADELPHIA.

WORSTED YARNS

RICHARD CAMPION.

SELLING AGENT FOR

Bristol Worsted Mills,
Highland Worsted Mills.
The French Worsted Co.

300 Chestnut Street,
PHILADELPHIA, PA.

THE MALCOLM MILLS CO.,

MANUFACTURERS OF

FANCY YARNS and POLISHED THREADS.

Offices: 229 Chestnut St., Philadelphia.
Mills: Frankford, Pa.

KROUT & FITE MANUFACTURING CO.,

Manufacturers of

Silk, Cotton and Mercerized Narrow Fabrics

Spool Tapes a Specialty.

Telephone Connection. Office and Mill, Allegheny Ave. and Emerald St., PHILADELPHIA.

F. W. MAURER & SONS CO.

MANUFACTURERS OF

TAPES, BINDINGS, NARROW FABRICS AND EDGINGS FOR NOVELTY CURTAINS

Office, 528 Cherry St. Factories, 529 & 531 Arch St. and 524 Cherry St., and Germantown Ave. & Bristol St.
PHILADELPHIA

HOFFMAN, DeWITT & McDONOUGH CO.,

Diamond Stay Bindings
TRADE MARK

Manufacturers of

Tapes, Webbing and Bindings.

COTTMAN and G STS., PHILADELPHIA
Ryer's Station, P. & R. R. R.
Bell Telephone, 203 Cheltenham.

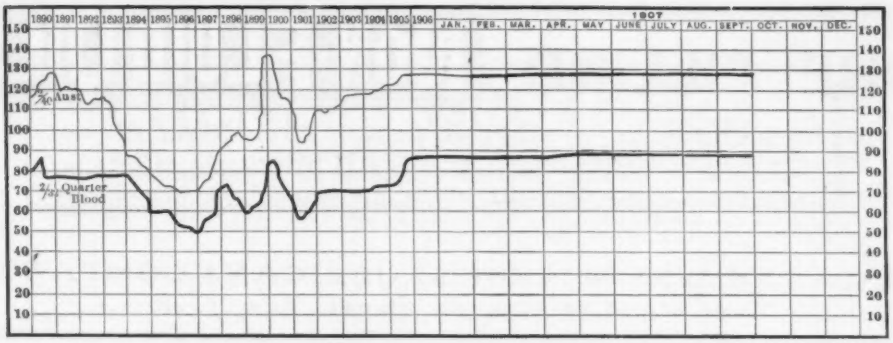


CHART SHOWING RANGES OF PRICE OF WORSTED YARNS.

The Woolen and Worsted Yarn Market.

The woolen and worsted yarn market still continues in a state of quietude, prices remaining firm and with very little change from those quoted for the past three or four months. Some spinners are of the opinion that the recent advance in London on all grades of wool will have a tendency to create a higher price on yarns. This fact, in some instances, is being brought to bear upon manufacturers in an effort to have them place their orders at prevailing prices in order that they may save money when the advance is made.

Mills running on low numbers and 2/32s are busy, reporting that the demand for these counts is very large.

Western business is still large, especially among the knitters. The knitting mills in the East, at this time, are very busy on original orders and the yarn used by them has been contracted for and is now being delivered. Duplicates are more or less slow in coming in and there seems to be a hesitancy on the part of buyers to place large orders for yarns on account of the weather and the condition of the coming winter. The underwear mills are exceedingly busy but on account of placing contracts for yarns earlier in the year they will not be on the market until later in the season.

The dress goods trade is reported as being very quiet and are placing their orders very slowly, with the exception of a few mills, which have exceptional lines that have taken well on the market. The inquiry for French spun yarns from 1/20s to 2/50s is active.

BRADFORD YARN.

2/12 to 2/16 low common	75-77½
2/26 to 2/28 common	77½-80
2/12 to 2/20 1/4 blood	82½-85
2/26 to 2/28 1/4 blood	85-87½
2/32 1/4 blood	87½-90
2/20 3/8 blood	90-92½
2/26 3/8 blood	95-97½
2/36 3/8 blood	97½-1.00
2/40 1/2 blood	1.10-1.15
2/40 delaine	1.21-1.22½
2/50 delaine	1.27½-1.30
2/40 Australian	1.30-1.32½
2/50 Australian	1.37½-1.40
2/60 Australian	1.50-1.52½
2/24 lustre	85
2/28 lustre	85-90
2/30 and 3/32 lustre	90-92½
2/36 lustre	95-1.00
1/24 worsted and 80s single cotton for raincloths	1.00-1.05
1/24 worsted and 120s single cotton for raincloths	1.15-1.20

FRENCH SPUN YARN.

1/20 1/4 blood	85-87½
1/20 high 1/4	93-95
1/20 3/8 blood	1.00-1.02½
1/20 high 3/8	1.05-1.07½
1/20 1/2 blood	1.12½-1.15
1/30 high 1/4 blood	95-97½
1/30 3/8 blood	1.05-1.07½
1/30 1/2 blood	1.15-1.17½
1/40 1/2 blood	1.17½-1.20
2/50 1/2 blood	1.30-1.32½
1/50 delaine	1.22½-1.25
1/40 Australian	1.32½-1.35
1/50 Australian	1.37½-1.40
1/60 Fine Australian	1.40-1.45
1/70 Fine Australian	1.45-1.50

New York, Fultonville. It is reported that Henry Heiser has bought the real estate formerly occupied by the Sovereign Knitting Mills, and that the plant will be started up on knit goods.

North Carolina, Apex. It is reported that a knitting mill to be capitalized at $30,000 is to be organized at this place. W. H. Harward, A. B. Hunter and others are reported as interested.

Ohio, Urbana. The Urbana Woolen Mills have been purchased by a syndicate headed by Jos. Fisher of Cleveland, Arnold Loewi of Brooklyn, San Scheuer of Cleveland, and W. E. Brown of Urbana. It is reported that the plant will be enlarged.

ONE FILLING NON-FLUID OILS

of A-OO Non-Fluid Oil in your Comb Boxes will run from 6 to 8 weeks as compared with ordinary fluid oil, which will run only from 3 to 6 days.

The cleanliness of Non-Fluid Oils renders them the *perfect* lubricant for textile mills—every ounce stays in bearing and lubricates until consumed. No dripping, spattering or waste. We will send you a free sample by paid express. When writing state name of Company and present lubricant used.

NEW YORK & NEW JERSEY LUBRICANT COMPANY
Dept. H. 14-16 Church Street, New York

Stealing from Mills.

The Society for Detecting Thefts from Mills recently held its annual meeting at Elberfeld, Germany. It consists of four subordinate organizations with headquarters at Crefeld, M-Gladbach, Solingen and Velbert. As a result of the work of the organization 41 persons have been brought before the Elberfeld courts charged with stealing or concealing silk, iron, yarn, belting, rubber, etc., from various mills in Elberfeld and Barmen. Since the organization of the association in June, 1884, 1,187 persons have been prosecuted, 837 of which were charged with theft, and 350 with concealing stolen goods.

The association has a satisfactory balance in the treasury. One of its methods consists in offering rewards to those who will reveal thefts from mills, with the assurance to the informers that their identity will be concealed.—Leipziger Monatschrift fuer Textil-Industrie.

How Money Talks.

A novel procedure was introduced at a recent annual meeting of a large limited company. A notice was placed outside the entrance door requesting shareholders holding over £10 worth of shares to sit on the right-hand side of the room, and shareholders with less than £10 worth to sit on the left-hand side. The general enforcement of such an arrangement might be difficult, but it would have its advantages. The noisiest and most prolix speakers at company meetings are often those with an infinitesimal holding of shares. The suggested arrangement would enable anyone to see whether or not a speaker was a substantial or a merely nominal shareholder. But the division would perhaps be better made at £50 than at £10. —The Manchester (Eng.) Guardian.

The Great Northern Paper Co.'s new plant at East Millinocket, Me., will have one 8-ton, 51-foot span, and one 15-ton, 47-foot span, Northern hand power crane. These cranes have been furnished and installed by the Northern Engineering Works, Detroit, Mich.

WILLIAM B. CHARLES,
Cotton Yarns,
Cotton Cloth,
Silesia, Sateens,
For the Underwear Trade.
AMSTERDAM, N. Y.
Boston Office, 200 Summer St.

EDWIN F. SCHOFIELD
ALL GRADES
PULLED AND FLEECE WOOLS
FOREIGN NOILS, CARPET WOOLS.
COTTON WASTE
New York Office 256 Church Street
Mariner and Merchant Building,
3d and Chestnut Streets, Philadelphia, Pa.

JOSEPH M. ADAMS CO.
WOOLEN YARNS,
Carpet Backing and Rug Yarns a Specialty.
ARCOLA MILLS,
Main St., foot of Centre St., Manayunk, Philadelphia.

Knitting and Weaving
YARNS.
Cones, Cops, Warps, Skeins,
Single, Double, Three-Ply, etc.
Peeler, Egyptian, Mixed Colors.
Large Assortment.
EDWARD S. HYDE,
226 CHESTNUT STREET,
Philadelphia, Pa.

CHENEY BROTHERS

Silk Manufacturers. So. Manchester, Conn.

Trams, Organzine and Spun Silks in the hank, or on spools and cones for woolen manufacturers.

Silks for electrical uses, insulation and special purposes made to order.

Knitting Silks, Ribbons and Piece Goods for Trimming Knit Goods.

Dress Silks, Satins, Linings, Printed Pongees, Foulards and Decorative Silks; Upholstery Goods, Ribbons, Sashes, Plushes and Velvets.

WILLIAM RYLE & CO.,

Foreign and Domestic

Spun Silk Yarns and Noils.

Domestic Thrown Silk of every description. Fine Pure Dye Silks for the woolen trade a specialty. Importers of European and Asiatic Raw Silk.

54 Howard St., cor. Mercer St., NEW YORK.

SAUQUOIT SILK MFG. CO.,

INSULATING AND BRAIDING SILKS.

ORGANZINE, TRAM & HOSIERY SILKS.

Fast Dye Organzines for Woolen Manufacturers a Specialty.

Mills: Bethlehem, Pa., Phila., Pa., Scranton, Pa. New York Representatives, Wm. Ryle & Co., 54 Howard St.—Phila. Office, 4015 Clarissa St., Nicetown.—Chicago Office, 210 Monroe St.—Boston Office, 78 Chauncy St.

Crochet Lace Edgings

Spun Silk, Splicing Yarn, Mercerized Yarns, Cotton Warps, Sewing Threads, Tapes, Braids, Domets, Cambrics, Silesias.

Write for Prices and Samples.

George W. Chapin, 229-231 Church St., Philadelphia.

The Pioneer Ticket Company

722 Broadway, New York City

Request the TEXTILE TRADE to write for estimates on their SPECIAL PRINTING. Up-to-date machinery. Big outputs. Small profits. Ask us for prices on OUR SPECIALTY, LOOM TICKETS in rolls, GOOD PERFORATIONS.

STATESMAN

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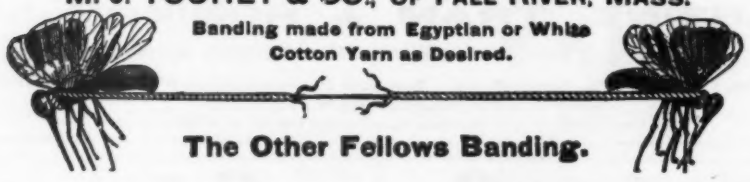
Banding made from Egyptian or White Cotton Yarn as Desired.



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Cones, Cops,
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COTTON YARNS
426 and 428
Market St., Phila.
Theo. H. Strouse & Co.

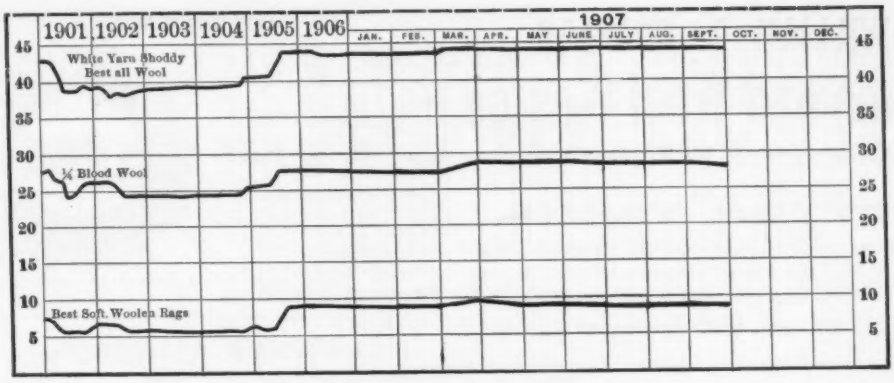

CHART SHOWING RANGE OF PRICES OF SHODDY, RAGS AND NOIL.

The Rag and Shoddy Market.

There has been no change in this market. The spinners of carded woolen yarns have a large part of their cards idle. With woolens neglected there has been no encouragement whatever to buy shoddy or rags on speculation. The result has been a very small hand to mouth business. Prices have been maintained at current quotations because the dealers know well that lower prices would not bring increased orders. The spinners do not need the stock and apparently do not expect any improvement in business in the near future. Under such conditions quotations are largely nominal. We quote as follows:

SHODDIES AND EXTRACTS.

White yarn, best all wool	40
White knit, all wool, best fine	35-40
White knit, No. 2	28-30
Light yarn, extra fine	25-28
New pure indigo blue	24

Merino.

Fine light, all wool	26-28
Medium light, all wool	18-20
Fine black, all wool	26-28
Fine dark, all wool, best grade	22-25
Medium dark, all wool, No. 2	15-17
Red knit stock, strictly all wool	22-24
Red flannel, all wool	22-24
Dark blue for hosiery, strictly all wool, No. 1	18
Dark blue for hosiery, not all wool, No. 2	14

WOOLEN RAGS.

Fine merchant tailors	10-11
Choice light colors	13-14
Browns	11-12
Blacks	9½-10
Fine blues, plain	9-10
Fine dark	11-12½
Medium dark	7-8

Worsteds.

Blue	16-18
Black	21-23

Serges.

New black	16-18
New blue	15-17

Flannels.

New scarlet	18-19
New blue	15-16
Cloakings	3-3½

SOFTS AND KNIT STOCK.

Soft woolens, best	7-7¼
Old white flannels	16-19
Old red flannels	13¼-14
Old blue flannels	6-7
Old plaids	4½-5
White stockings	24-25
White hood stock	18-20
Clear hoods	10-11
Blue stockings	9¾
Fancy stockings, No. 1	9½
Gray stockings	9-10
Black stockings	9-10
Knit stock comforters	7-8
Red knit	12-12½
Light gray knit	9-10
New light fancies	10
New fancies	10¾-11¾

Merinos.

Light, fine	14-15
Light, coarse	7-7½
Fine, dark	13-13½
Coarse, dark	5-5½
Blue	11-12
Black	13-14

FLOCKS.

Shear, fine white, all wool	9-11
Fine indigo blue, all wool	8-9
Fine black and blue, all wool	6½-7
Fine dark, all wool	4½-5
Gig, fine, all wool	1¼-4
No. 1 black, all wool cut	6-8

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COTTON WASTE.

No. 1 Spinners	12-12¼
Machine Cop	7½-7¾
No. 1 Cop	7¾
No. 1 Card	10-11
No. 2 Card	8-9
No. 1 Oily Card	6
No. 2 Oily Card	4
Peeler Combing	
Egyptian Combing	
No. 1 Linters	4½
No. 2 Linters	3½-3¾
Woven White Clips	5
Woven Colored Clips	2-2½

Dyestuffs and Chemicals.

Acids.

Acetic, 100 lbs.	2.60-2.75
Citric, domestic	51-52
Oxalic	8¼-8½
Sulphuric, 60 deg., 100 lbs.	1.00-1.50
Muriatic, 18 deg.	1.10-1.75
Tartaric crystals	28¼-29¼

Miscellaneous Chemicals.

Acetate of lime, gray, 100 lbs.	2.50-2.55
Alum, lump	1.75-1.80
ground	1.85-1.90
powdered	3.00-4.00
Aqua ammonia, 26 deg.	4¾-5¾
Ammoniac, sal., gray	6¼-6½
Borax, bbls.	7½-8½
Brimstone, crude, foreign ton	22.50
Copperas	55-65
Cream tartar, crystals	23¼-23¾
Fuller's earth, powdered, ton	18.00-22.50
Glauber's salt	45-60
Potash, chlorate, crystals	9¼-9¾
powdered	9½-10
carbonate	4-5½
Soda, bicarbonate, English	
American	
Soda, caustic, domestic, 60 per cent.	1.80-2.00
Sal. American	70-85
Sulphate, alumina	
Vitriol, blue	6¼-6½

Dyestuffs.

Acetate of soda	4½-5
Acid, picric, best crystals	23-26
tannic, commercial	58-60
Albumen, egg	59-75
blood	27-30
Alizarine, red	15½-16½
Aniline, oil	11½-12
salt crystals	10½-11
Antimony salt, 65 per cent.	22½-25½
Bichromate of potash, American	8⅝-9
Bichromate of soda	7⅛-7½
Bisulphite of soda	80-1.15
Cutch, mat	4¾-6¼
boxes	5-7
Dextrine, imported potato	5½-7
corn	2.75-2.90
Divi-divi, ton	47.50-55.00
Flavine	25-55

FIRE, LIGHTNING, WINDSTORM.

The HOME INSURANCE COMPANY NEW YORK

Organized 1853. MAIN OFFICES, 56 CEDAR ST.

Cash Capital, $3,000,000.

ASSETS January 1st, 1906	$20,839,174
LIABILITIES (Including Capital)	13,430,818
NET SURPLUS OVER ALL LIABILITIES	7,408,355
Surplus as regards Policy-holders	10,408,355
Losses Paid Since Organization Over	105,000,000

Note amount of net surplus after providing for all San Francisco losses.

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IS prepared to entertain liberal lines on Sprinkler-Equipped and Modern Improved risks generally, having a special department for the consideration of such business.

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FREDERICK C. BUSWELL, Vice-Pres. CHARLES L. TYNER, Secretary.
CLARENCE A. LUDLUM, Ass't Sec'y. HENRY J. FERRIS, Ass't Secretary.

Fustic, stick, ton	16.00-20.00
young root	31.35
Gambier	4½-4¾
Hypo. of soda, Am. bbls. cwt.	1.50-1.75
Indigo, Bengal, low grade	55-65
medium	62½-65
high grade	77½-90
Kurpahs	50-65
Gautemala	45-72½
Manila	40-55
Madras	42½-50
J. (Synthetic)	18-20
Indigotine	95-1.80
Logwood, stick, ton	18.00-22.00
roots	16.00-19.00
Madder, Dutch	12½-15
Muriate of tin, 36 degrees	9-0¼
52 degrees	15-15¼
Nitrate of iron, commercial	1¼-1½
Nutgalls, blue Aleppo	16-18
Persian berries	20-25
Phosphate of soda	2-2½
Prussiate of potash	16-16¼
Quercitron, ton	21.00-25.00
Starch, corn, pearl, bbls.	2⅛-2½
corn, pearl, bags	2.20-2.40
potato	3½-4¼
rice	6½-7
wheat	5¼-6
Stannate of soda	12¼-15
Sumac, Sicily, No. 1, ton	75.00-85.00
Sicily, No. 2, ton	70.00-80.00
Tapioca flour	1¼-4
Tin crystals	23¼-27¼
Turmeric, Madras	4½-7
Zinc dust	5¼-6

*New York. Little Falls. The new dye house being built for the Gilbert Knitting Co. is practically completed and they advise that all machinery and supplies have been contracted for.

North Carolina, Weldon. It is reported that the knitting mill recently built at this place (by the Seaboard Air Line) will be sold owing to lack of capital.

Ohio. Dresden. It is reported that C. T. Marshall, of Zanesville, and Frederick C. McLaughlin, of New York City, have been appointed receivers of the Zanesville, Dresden, and Frazeysburg plants of the Kapner Bros. & Duga Hosiery Co., Inc.

Ohio, Sandusky. The Fremont Mitten & Glove Co. is reported to be considering plans for the erection of a $100,000 plant at this place.

Pennsylvania, Allentown. The Allentown Spinning Co. is to increase the capital stock $100,000. It is stated that the above company proposes securing the business of Sutherland & Edwards, of Paterson, N. J.

*Pennsylvania, Bally. It is reported that Wallace Stengel's knitting mill, containing 16 knitters, operated on cotton hosiery, which was run by W. C. Urner & Co. until their failure, and which was started up again by Mr. Stengel, has recently been sold to Gus. E. Brogley who is now operating it.

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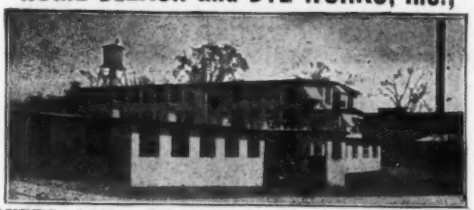

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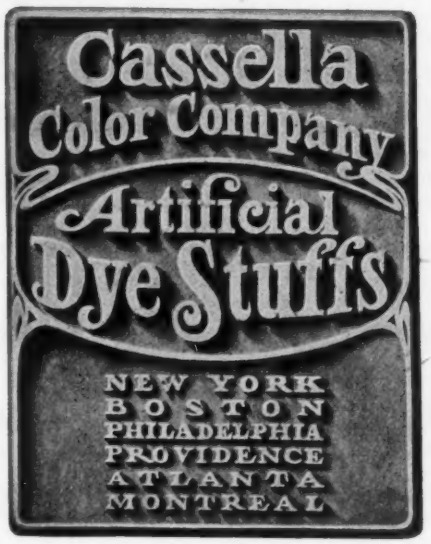

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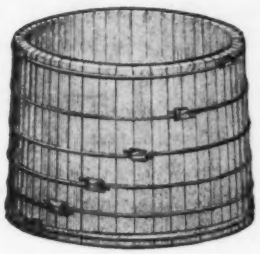

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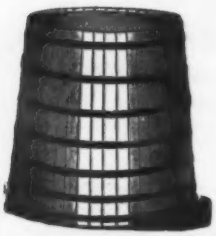

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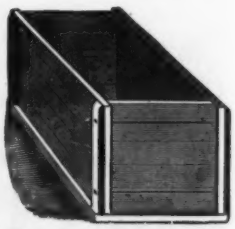

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Send for catalog. Established 1849.

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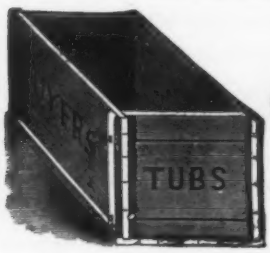

Established 1868.

AMOS H. HALL, SON & CO.,

Manufacturers of

Cedar Vats and Tanks

2915-2933 North Second Street,

PHILADELPHIA, PA.

Tubs and Tanks of all kinds for Dyers, Bleachers, Factories, etc.

Down Town Office, 140 Chestnut Street, Corner Second.

Hours from 12 to 1

The Hosiery and
Knit Goods Trade,
are large users of

TRADE
TURKISH SOFTENER
MARK

for

Fast Black Dyeing,
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Also Resolvent Compound, Olive Oil,
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THE COHNEN
CENTRIFUGAL
Dyeing Machine

U. S. Patent 776,295, Nov. 29, 1904.

Dyes Raw Stock
or
Yarn in Cops, Skeins or Bundles (Warps)

DYES SULPHUR COLORS
without bronzing or streaking and leaves the stock in perfect condition for carding or weaving.

ONLY ONE HANDLING
is required to dye, oxidize and hydro extract ready for the drying room.

The Machine may be seen in operation by applying to the American Agents.

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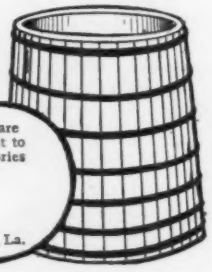
TANKS



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Double the life of Dye Tubs, Tanks, Vats, Understructures
And all kinds of wood work by using AVENARIUS CARBOLINEUM

A self-impregnating paint of heavy specific gravity which penetrates deeply into the woodwork, preventing rot, dry rot, or decay. Expels and repels moisture from wood making it waterproof. Prevents checking and warping. Makes wood tough and hard, increasing its resistance against strain. Applied with a brush or by immersion of the wood. No skilled labor required. Treated paving blocks furnished.

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NORWOOD ENGINEERING COMPANY,

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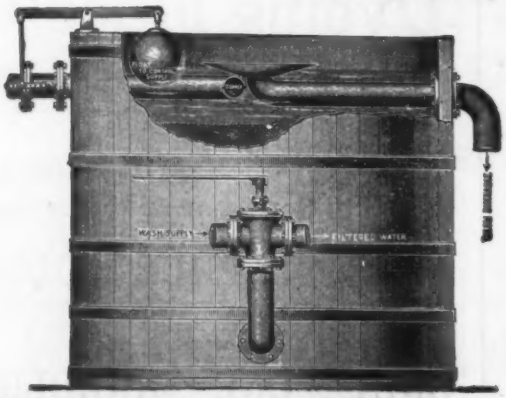

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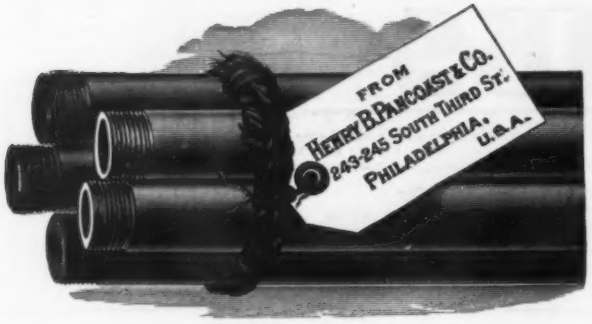
Our filters are already in use in a number of the representative textile mills of the country, from whom we have received many expressions of satisfaction. Our representative will call and explain our system whenever desired.



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WROUGHT AND CAST IRON PIPE
for steam, water and gas.

BRASS, COPPER AND LEAD PIPE

Iron and Brass Fittings, Valves, Etc.
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Steam and Hot Water Heating Apparatus.
Steam Specialties, Pipe Fitters' Tools, Etc.

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Trucks for Yarn Dryers and Dye Houses

that are designed and built with a wide and comprehensive knowledge of the actual every day requirements in these lines. In trucks as in other lines it pays to buy the best. *Bailey's trucks are the kind you need.* Once tried always used. Tell me your needs and I will tell you about the truck that meets them.

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MACHINE COMPANY

HIGH SPEED ELASTIC STITCH SPECIAL SEWING MACHINES FOR MANUFACTURING PURPOSES

TRIPLE THE EFFICIENCY of YOUR OPERATORS.

Bound Neck.

(1) Cutting Out Neck Piece
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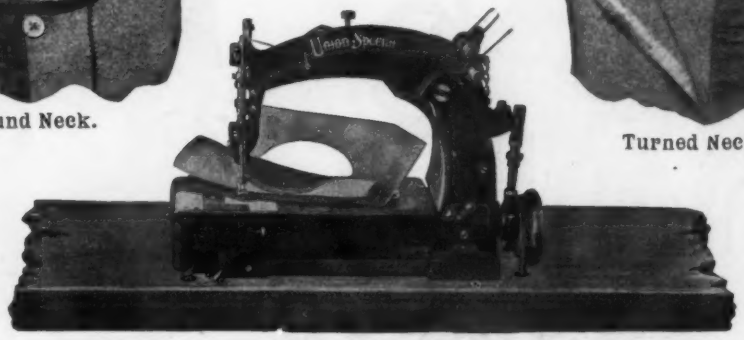
(3) Ornamental Edge Covering
all in One Simple Operation.

Turned Neck.

Perfect Work.



High Speed.

STYLE 6900 G.

SPECIALLY DESIGNED FOR "NECKING" KNIT UNDERSHIRTS.

The one machine may be used to make either turned or bound necks.

(Both operations on this machine, patent applied for.)

Most Durable Sewing Mechanism Ever Constructed.

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We-Fu-Go and Scaife Water Softening Plants, and Scaife Water Filters can be seen in actual operation in Textile Plants in any part of the U. S. Apparatus designed to suit each special case, and we guarantee results. Write for Illustrated Catalogue.

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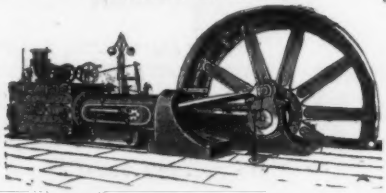

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Simple, Compound and Condensing, of any size, for all purposes.
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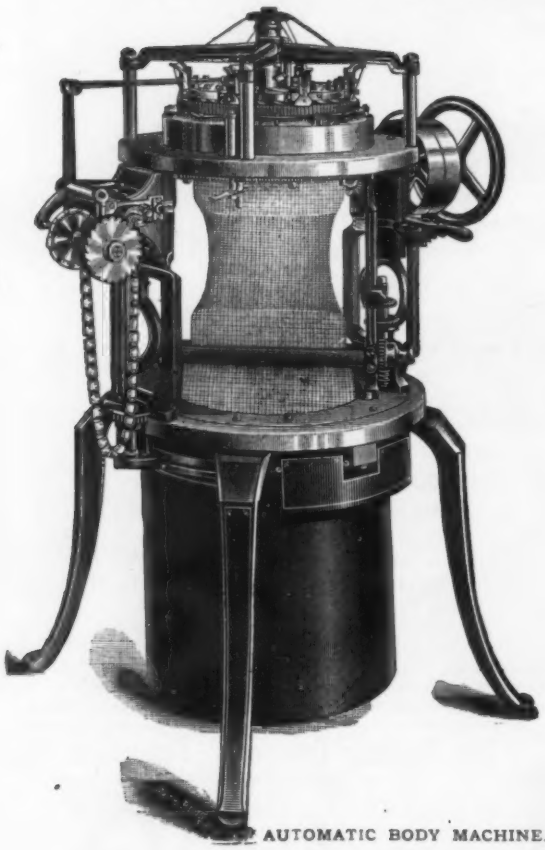
WILDMAN MFG. CO.,

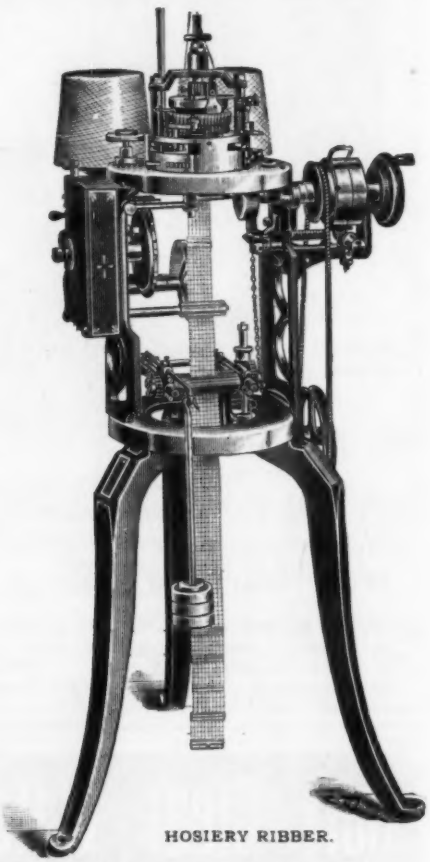
CIRCULAR RIB KNITTING MACHINERY

AUTOMATIC AND PLAIN

For all classes of Ribbed Hosiery and Underwear, Combination Suits, Sweaters, etc.



AUTOMATIC BODY MACHINE.



HOSIERY RIBBER.

ESTABLISHED REPUTATION FOR LARGEST PRODUCTION,
BEST QUALITY FABRIC, DURABILITY, ECONOMY OF OPERATION.

Full Particulars, Description and Samples Furnished upon Application to the

WILDMAN MFG. CO.

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FRIEDBERGER-AARON MFG. CO.

Leading Manufacturers

Braids and Edgings

For Trimming

Ladies' Ribbed Underwear.

Having Installed More New Machinery and **Increased Our Facilities** in general, we are in better position than ever to sustain our **Established Reputation.**

Mills: Germantown, Philadelphia

P. O. Address, Logan Station, Philadelphia.

If You Want

Largest Production For Least Money

Write

Geo. D. Mayo Machine Co.,

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Latest
Simplest
Best

MAYO'S

New Full Automatic Knitter

PHILADELPHIA OFFICE,
KNICKERBOCKER BLDG., COR. SIXTH AND ARCH STS.,
B. M. DENNEY, REPRESENTATIVE.

NYE & TREDICK CO.

Circular Rib Knitting MACHINERY

For making Ribbed Underwear, Combination Suits, Sweaters, Cuffs, Shirt Borders, Hosiery, etc. : ; :

Correct Construction. Excellence and Durability.

LATEST IMPROVEMENTS
QUALITY OF FABRICS AND PRODUCTION
UNEXCELLED

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Notice to Hosiery Manufacturers!

The Most Productive, Strongest and Best

Full Fashioned Hosiery Machines

System **G. Hilscher, Chemnitz, Saxony,**

Can Be Delivered in Short Time and Fully Guaranteed
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WOOL EXCHANGE
Rooms 400-421-423

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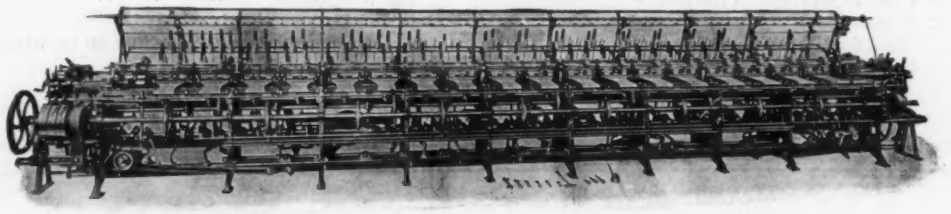
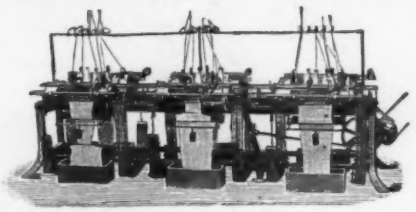


18 Section "COTTON HILSCHER" Machine for Full Fashioned Silk Hosiery
Gold Medal, Paris, 1900 Numerous Patents Covering Special Improvements

All Special Machines For Any Article That Is Knit

GROSSER Flat Knitting Machines
For HAND Power or FULLY AUTOMATIC Power MACHINES. Most productive and best machines for Sweaters, Jackets, Blouses, Wool Hosiery, Gloves, Mittens, Sporting Goods in Plain, Fancy and Jacquard Work, Shaker Articles, etc. Large stock on hand. Power Machines to be seen in operation.



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C. Terrot Söhne, Cannstatt, Würt, famous builders of the best Circular Frame for Finest Underwear, Fleece Linings, Gloves, Special á-jour (open work) Fabrics, etc.

RASHEL MACHINES [Double Rib Warp Knitting Machines.]
For Fancy Goods in largest variety, Shawls, Capes, Caps, Borders, Fringes, Lace Work, etc., in silk, wool, cotton.

SPOOLERS, Parafiners, Finishing Machines for the knitting business.

Exclusive Agency for the Famous

Julius Koehler DIAMENT OVERSEAMERS, indispensable for all full fashioned articles, Hosiery, Gloves, Jersey Sweaters, Sporting Goods, etc.

LOOPERS Double thread Lock stitch, self-cutting and cleaning attachment. Reliable money saver.

FRITZ ZACKE LATCH NEEDLES, for any purpose in the knitting line, patented rivets.

Samples, Specifications, Prices, etc., upon application.

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ALL KINDS OF NEW AND SECOND HAND

KNITTING MACHINERY

A RARE OPPORTUNITY TO BUY.

1 Bruce band folder and cutter.
38 Beattie & Hepworth & Abel loopers.
6 Hosiery presses (lever).
114 Lamb and Grosser sweater machines.
200 Ribbed underwear machines, various sizes.
50 Brinton & Co. ¾ aut. knitters, sizes.
30 Union Special machines, various styles.
1 Rotary fire pump.
100 feet woven rubber hose, 3 inches dia.
1 paper cutter.
3 Toque machines.
100 Brooks welters.
8 Fleecing machines. (Nappers.)
250 Brinton & Co. and other make hosiery ribbers.
140-Ribbed shirt machine cylinders and dials, all sizes, cuts and makes.
2 Grosser Jacquard machines for gloves.
3 Cyclone dryers. (Hosiery.)
2 Typewriters.
5 Band folding and cutting machines.
1 Centrifugal Pump.
1 Small Steam Pump. 1 Small Belt Pump.
15 Rudolph Sewing Machines.
2 Lamb border machines, auto. rack.
1 Newmans watchman's clock, 16 stations.
10 German sweater machines, flat.
3 Double Ribbed Machines.
1 Fireproof Safe.
5 Cop and Skein Winders.
2 Pownall Screw Presses 34 x 52 in.
1 Cleveland 42" Belt Driven Extractor.
5 Pair Platform Scales.
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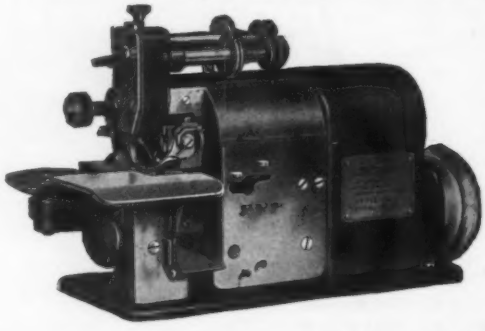
3 Cornely Embroidery Machines.
34 Standard "B" 200 Needle Machines.
20 " B 188 " "
54 " B Machines for sizes.
24 Mayo "Acme" " " "
500 Dozen hosiery shaping boards.
1 Crane Style Collarette Machine 20 in. diameter 16 Needles.

WRITE FOR COMPLETE LIST. APPRAISEMENTS A SPECIALTY.
We are always in the market to buy good second-hand Knitting and Finishing Machinery.

The Merrow

FAST
DURABLE
Light Running

High Speed Overseaming, Overedging and Scallop Stitch Machines are



OUR NEW STYLE 60 MACHINE for Trimming and Overseaming in one Operation produces the strongest, best Seam and does it with the greatest economy.

USE STYLE 18 for Horse Blankets. STYLE 17 or 22 for Bed Blankets. STYLE 35 B SHELL, for Necks and Fronts of Rib Goods, produces the most showy, substantial finish.

Send for Catalogue and Samples.

THE MERROW MACHINE CO. HARTFORD, CONN.

Knickerbocker Building, Sixth and Arch Sts., Phila. 346 Broadway, New York

Full Fashioned Hosiery Machines

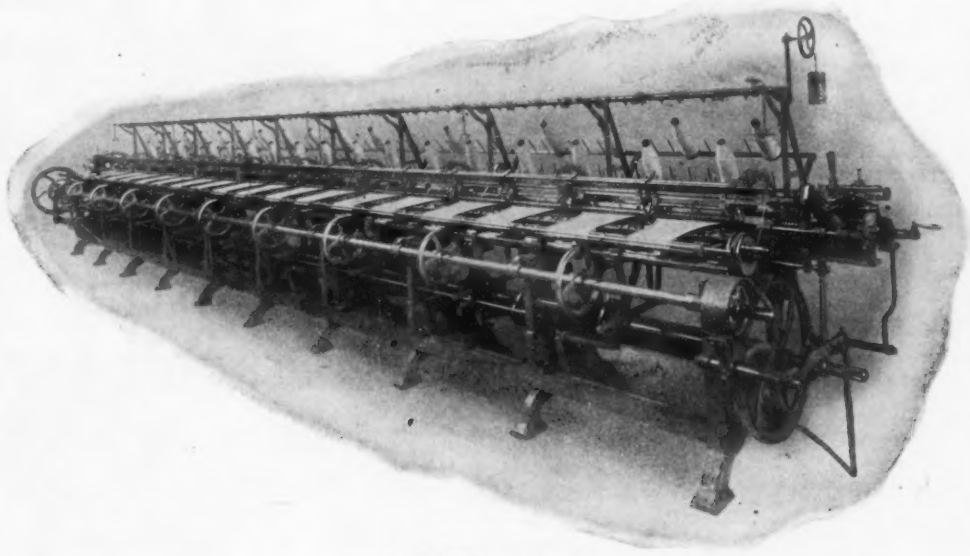
BUILT BY

SCHUBERT & SALZER

Largest Manufacturers of all classes of Hosiery Machines.

The plant, which is located in Chemnitz, Germany, declared by engineering experts and hosiery manufacturers to be the finest of its kind, is equipped with the most modern American and European machine tools, employing 1600 skilled workmen.

These machines have been proven the best constructed and most productive in the market for the manufacture of cotton, lisle and silk hosiery and since their introduction into this country 13 years ago have always been the leaders among a number of competitive makes, as upon trial they have fully borne out all that is claimed for them.



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All the leading manufacturers of full fashioned hosiery in this country. Largest individual order for 65 eighteen section machines placed recently by the new million dollar concern, the Brown-Moore Hosiery Co. of Philadelphia.

AMERICAN REPRESENTATIVE:

OTTO WALTHER, = 507 Bourse, = Philadelphia.

The Invincible

Full Automatic.

"The KNITTER that KNITS"

THE LARGEST PRODUCER OF PERFECT WORK.
SIMPLE, POSITIVE AND EASY TO OPERATE.

E. JENCKES MFG. CO.

Pawtucket, R. I.

PHILADELPHIA OFFICE,
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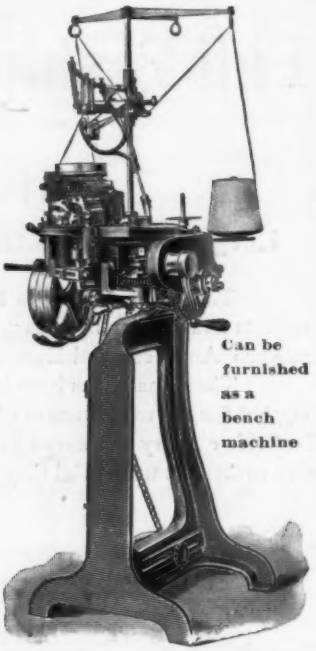
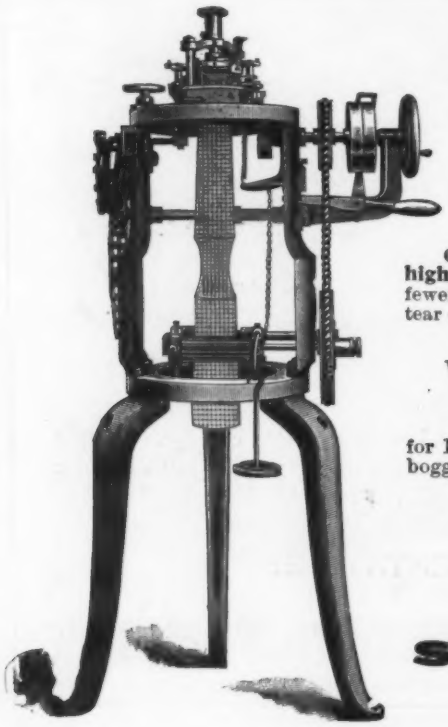


Can be furnished as a bench machine



High Speed Rib Knitting Machinery.

Our latest model machinery has been designed to run at very high speed, giving large production. This is accomplished with fewer seconds, less breakage of needles, less jar and wear and tear on machines than has been customary at lower speeds.

We also make Special

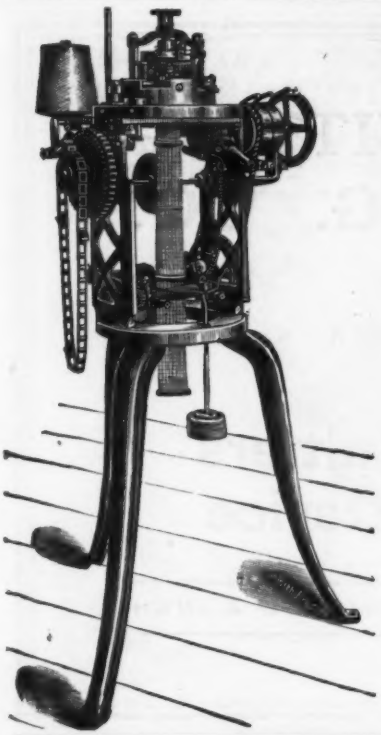
STRIPING AND DESIGNING MACHINES

for Fancy Golf Stockings, Bathing Suits, Sweaters, Toques, Toboggan Caps, Skirts, etc.

Our Machinery gives large production at low cost and enables manufacturers to meet the market always and make a profit.

STAFFORD & HOLT,

LITTLE FALLS, N. Y.



H. Brinton & Co.

213-215 Race Street, Philadelphia, Pa.

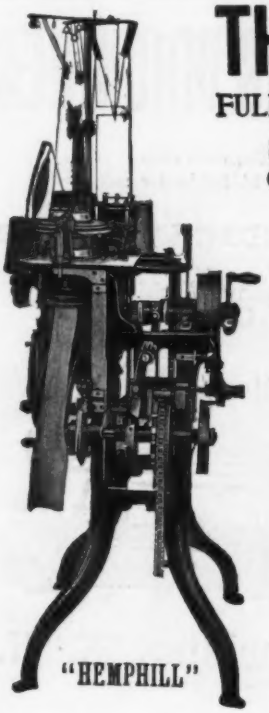
BUILDERS OF

Knitting Machinery

For HOSIERY and UNDERWEAR.

Complete Estimates Furnished. ***Send for Particulars.***

The cut shows our **Improved Automatic Ribber** with **Welt and Slack Course** for Half Hose, Tops and Ribbed Legs.



"HEMPHILL"

THE TWO LEADERS

FULLY AUTOMATIC HOSIERY KNITTERS

FOR MAKING ALL KINDS AND GAUGES OF SEAMLESS HOSIERY

One with **GEARS**, the other with **CHAIN** for pattern mechanism, to meet the various tastes of different manufacturers.

Both used and approved by leading hosiery manufacturers.

Both contain all the well-known essentials demanded of first-class knitting machines.

With these two machines we can supply all manufacturers' possible wants in the best possible manner.

Write us for further particulars and prices.

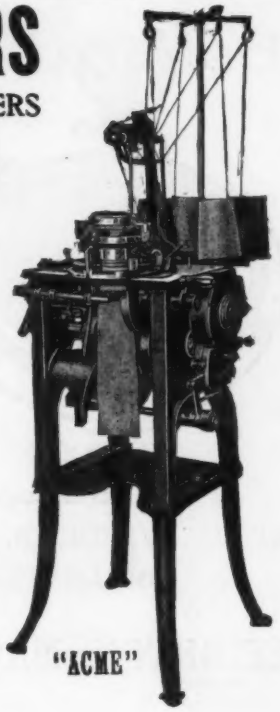
We also make all kinds of **LATCH NEEDLES.** Many leading manufacturers use our needles and say they are the best on the market. Send us a trial order.

MAYO

KNITTING MACHINE AND NEEDLE COMPANY

FRANKLIN FALLS, N. H.

Philadelphia Office, Knickerbocker Bldg., cor. 6th & Arch Sts.



"ACME"

EXCELSIOR KNITTING MACHINE MFG. CO.

Meadow and Washington Streets

ALLENTOWN, PENNA.

BUILDERS OF

Full Automatic Knitters

With or without **Transferring Device**

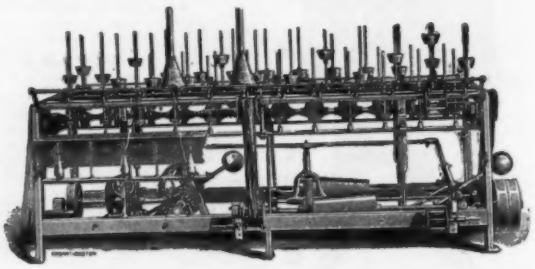
ALL SIZES AND GAUGES, 2 1-4 INCH TO 4 INCH

CIRCULAR KNITTING MACHINES

Either plain or full automatic, with stop motions complete. 4 to 24 feeds for

RIBBED UNDERWEAR

Automatic Racking and Striping Machines for Sweaters, Cardigans, Collarettes, Cuffs and Anklets.



ALSO BUILDERS OF THE WELL-KNOWN

ABEL WINDERS, SEAMERS and LOOPERS.

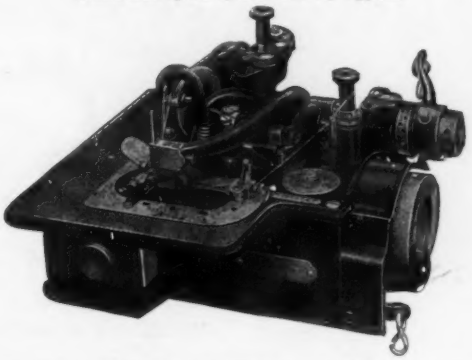
LEIGHTON MACHINE CO., - Manchester, N. H.

AN INSTRUMENT OF PRECISION!

"OVERLOCK" MACHINE

(Trade Mark) (Pat. April 5, 1892)

Patent twice upheld by U. S Court of Appeals



Trade Mark

Business Established in 1859.

For TRIMMING, SEAMING (or Hemming or Overedging) and COVERING Raw Edges of Knit Underwear and Hosiery in **ONE OPERATION** at **3000 Perfect Stitches per Minute.**

WILLCOX & GIBBS SEWING MACHINE CO.,

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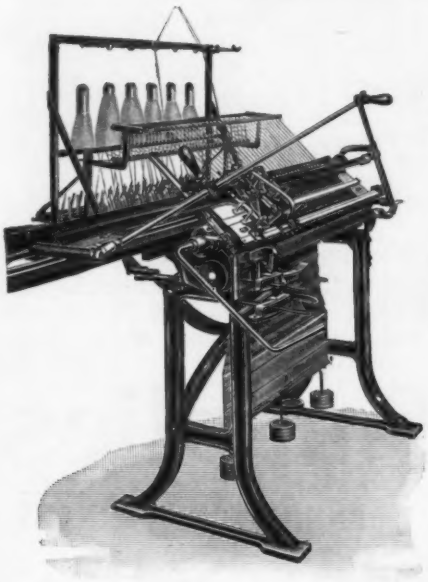
NEW YORK, N. Y.

LONDON PARIS MILAN DRESDEN BRUSSELS NOTTINGHAM

WALTER & CO., Limited

Mühlhausen i/Thür, Germany.



SPECIAL MANUFACTURERS OF

Knitting and Winding Machines

for hand and power driving, of best quality and perfect construction.

Specialty: Jacquard Machines

for hand and power driving for manufacturing of sweaters and every possible fancy article of that nature.

PRICE LIST AND SAMPLE ON APPLICATION

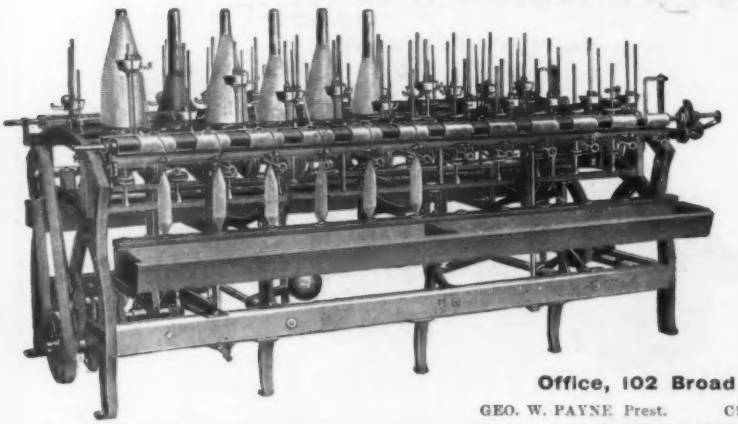
American Representative

E. W. S. JASPER,

120-122 Liberty St., New York.

OVER 1,900 PAYNE WINDERS IN USE

By Hosiery Manufacturers,
Wind for Cop, Skein or Bobbin.



Improved

Upright Spoolers,

To Spool from Cop, Skein or Bobbin.

Doubling Spoolers for doubling 2, 3, or more ends into one.

Upright Quillers, Quill from Cop, Skein or Bobbin.

Ring Dresser, Spooler and Reel Spindles, Cop Skewers, Warp, Spool, Spooler, Guides, Bolsters and Stops Made and Repaired at Short Notice.

GEO. W. PAYNE CO.,

[Est. 1865. Inc. 1903.]

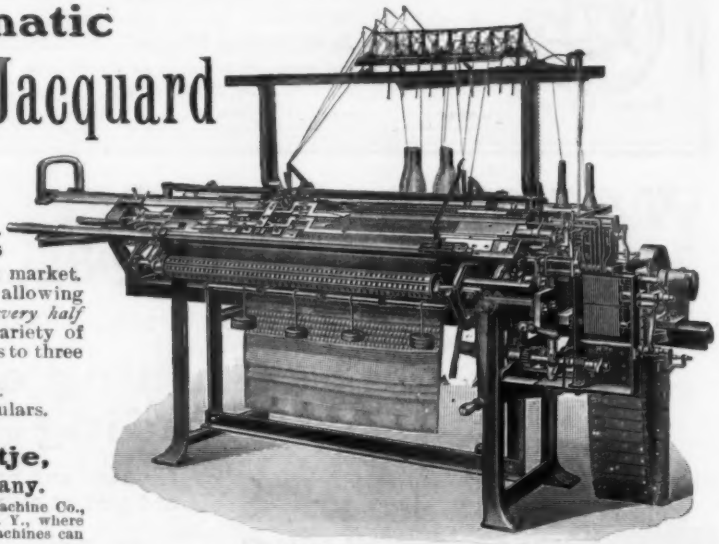
Office, 102 Broad Street, Pawtucket, R. I.

GEO. W. PAYNE Prest. CLINTON F. PAYNE, Sec'y. and Treas.

Full Automatic
Noppen & Jacquard
Machine

for high-grade sweaters, jerseys, etc.
Latest improvements

Recognized as the best in the market. With jacquard attachment allowing *change of operating mechanism every half round*, therefore unrivaled in variety of patterns. One operator attends to three of these machines.
High speed. Large production.
Ask for samples and full particulars.
State gauge and size you need.



Claes & Flentje,
Mühlhausen Thr., Germany.

Representatives: Ainslie Knitting Machine Co., Ainslie and Humbol Sts., Brooklyn, N. Y., where all kinds of our hand and automatic machines can be seen working.

Oils

Sewing Machine Belting, Press Boards, Belt Hooks, Lace Leather, Leather Belting, Latch Needles, Oilers of every description, Mill Baskets and Brooms, Mill Banding, Rings and Springs, Packings of all kinds, Fine Pails, Shears and Trimmers, Cloth Knives, Etc.

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HUDSON, N. Y.
Established 1831.

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WILLIAM C. BULL, BENNINGTON, VERMONT.

MAKER OF

For Ladies', Gents' and Children's Goods.
Latest Styles.
Best Workmanship.

Drying Form Boards

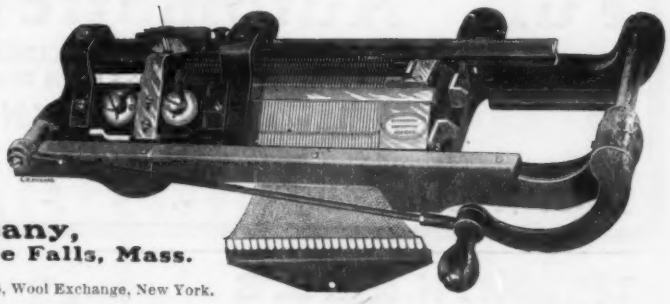
OF EVERY VARIETY.

The LAMB

LEADER OF KNITTERS

Original and Still the Best.

Most widely used; being operated in every civilized country in the world. For description, prices, etc., see catalogue.



Circular Machines, Rib Top and Seaming Machines.

Lamb Knitting Machine Company,

P. O. Box, 5888, **Chicopee Falls, Mass.**

J. E. WOODHEAD, 100 22d St., Chicago.
L. D. SANBORN, Room 505, Wool Exchange, New York.

CHARLES H. SCHNITZLER,
Patentee and Sole Manufacturer of
THE PNEUMATIC CONVEYOR

For the handling of wool and cotton stock, rags, excelsior, jute and all kinds of fibrous material, wet or dry. Also spool elevators, steam heating and ventilating, and mill work generally. Blower and fan work a specialty. This conveyor is patented. Beware of infringement.

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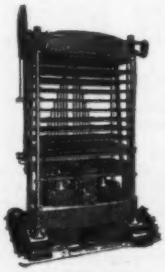

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The most reliable machine of the kind on the market.

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Will cut anything with a Welt

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Full Automatic Knitter

FOR ALL KINDS AND GAUGES OF SEAMLESS HOSIERY.
RANGE ON HALF HOSE AND LADIES FROM 260 NEEDLES DOWN.

3-4 AUTOMATIC KNITTER

With Lace Effects.

Exclusive rights to BROWN'S LACE ATTACHMENT.

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Patent Single-Stitch

LOOPING MACHINE.

Needle working from the inside, avoiding the breaking of needles and points and picking up the metal.

Single and Double Stitch, or Both Combined.

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Both single and double Stitch.
with the
Patent Raised
or
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GAS ENGINES for city or country
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KNITTING MACHINERY
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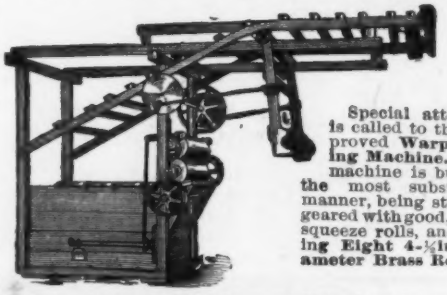
The Reliance Warp Dyeing Machine.



Special attention is called to this improved **Warp Dyeing Machine.** This machine is built in the most substantial manner, being strongly geared with good, heavy squeeze rolls, and having **Eight 4-½in. Diameter Brass Rolls.**

This machine, with our Improved Plater-down has met with marvelous success, and parties desiring machinery of this class, can make no mistake on ours For further particulars and prices, address

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A necessary article in every Textile Mill
Agents Wanted.

Handle holds the ink. Send for particulars and circular.

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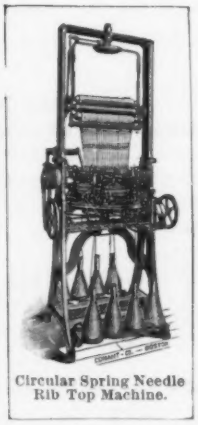

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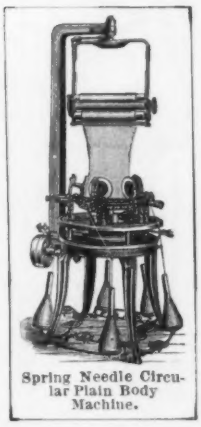
Knitting Machinery

Flat and Circular Rib, both Spring and Latch Needle, Plain Circular Machines, Lead or Trick Cylinder.



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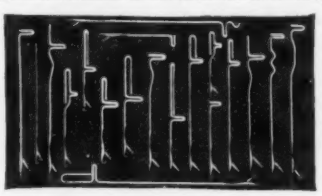
Spring Needle Cylinder Rib-Top Machines

For making Cuffs, Drawer Bottoms and Shirt Borders.

Spring Needles.

Spring and Latch Knitting Needles, Burr Wheels, Burr Blades, Sinkers, Jacks, Etc.



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COLLARETTE ATTACHMENT.

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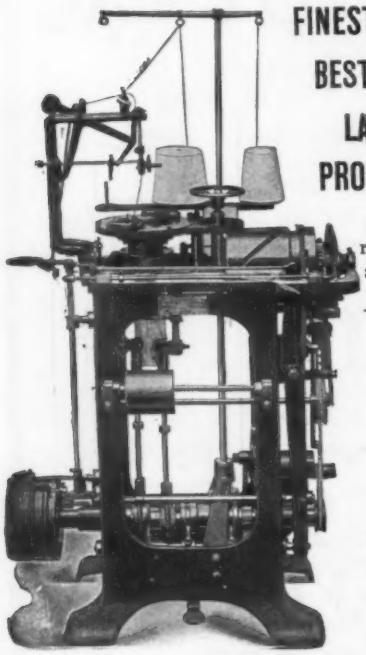
"NATIONAL"

Stands for



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Greatest Variety of Laces and Novelties.

All automatic.

Lowest Cost for Operating

Also
Rib Knitting Machinery, Overedge, Crochet and Shell Stitch.

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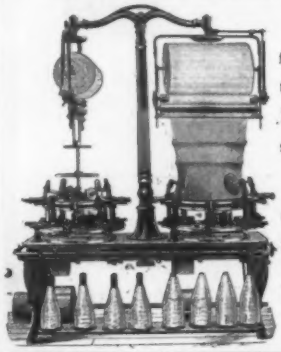
728 Cherry Street, PHILADELPHIA, PA.

We are the Oldest Manufacturers

of this Design of Machine in this Country



The members of our firm are originators, as the records of the U. S. Patent Office will show since 1875.

Call and look over our numerous improvements.

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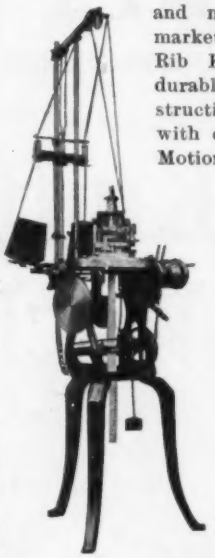
Ruth Rib Knitting Machinery is the latest



and most improved in the market to-day for any style of Rib Knit goods. They are durably built, simple in construction and easily operated with our Automatic Stop Motion.

We have attained the greatest production with the least menders and needle breakage over all other machines

Write for our liberal trial proposition

RUTH
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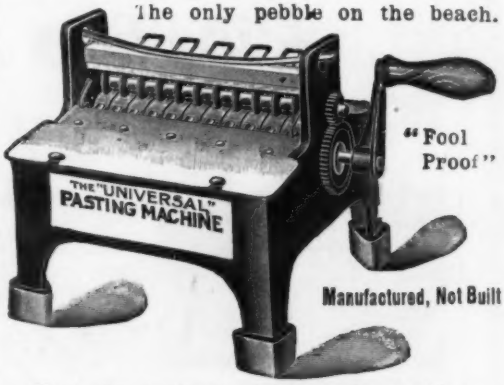
The only pebble on the beach.



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Manufactured, Not Built

Meets the need for a high grade machine at a price for everybody.

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Gums an ordinary shipping label or the finest surface-coated stock without injury. **Over 10,000 in use.** Can be made to drive from an electric-light socket; other styles and sizes furnished.

5-inch Roll, Hand-Power, $10.00.

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Hosiery Machines

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Investigate what *each make of machine will do*, in quality and quantity of product, the cost of repairs, length of life, etc. Such an investigation will show *you* why so many manufacturers

Buy the Standard F

It is good on the start—and *stays good*

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HOSIERY MACHINES. 508 Ludlow Street, Philadelphia, Pa.

Do you wish to make knit goods as perfect as the French or German, and as rapidly as the American?

Do you want to plait?

Do you want to knit worsted or silk?

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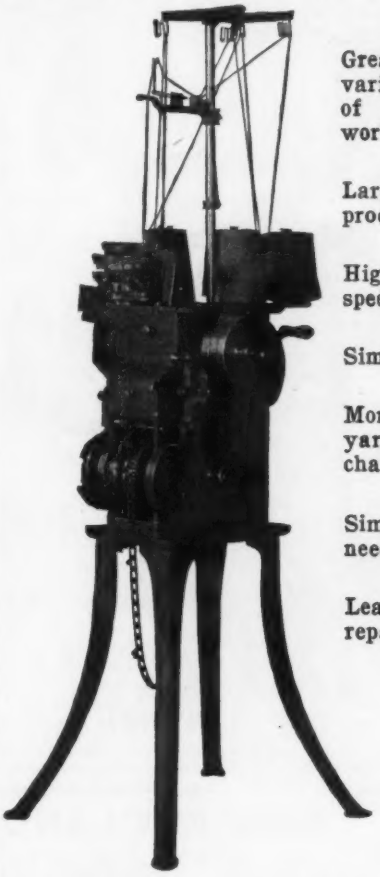
"The Banner"

FULL AUTOMATIC MACHINE.

Specially adapted to Platted Goods.



Greater variety of work

Largest production

Highest speed

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More yarn changes

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The wonder of the 20th Century

Manufactured by the

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Established 1870.—Incorporated 1890.

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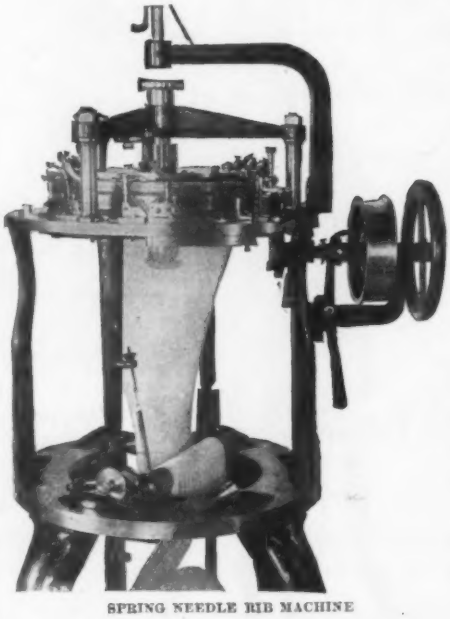
Spring and Latch Needle Machines for both rib and plain work, producing a great variety of fabrics. Patent removable hardened Wing Burr Wheels.



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The New Boss Seamless Knitter

Do you want the biggest production with the least menders, for the least money? If so, write to the Boss Knitting Machine Works for their circular with full directions. There is no cylinder to be handled. We use only one cylinder and transfer device for half hose or ladies' hose. This machine beats them all. Has no equal for simplicity and durability. Makes 300 revolutions per minute. Built in sizes from 2¼ to 5½; from 40 to 224 needles. Automatic in heel and toe. It is the strongest built knitter on earth.

Send for prices and particulars.

THE BOSS KNITTING MACHINE WORKS,
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KNIT FABRICS CUT TO LENGTH.

Our Knit Fabric Cutter

will cut from the roll, knit fabric into any length from 10″ to 40″ at the rate of 100 pieces a minute. The lengths are accurate, the waste is a minimum, the labor unskilled.

We also make a Slitter

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BRAIDING MACHINERY

ALL STYLES AND KINDS FOR FLAT AND ROUND BRAIDS.

SOLID SASH AND CURTAIN CORDS,

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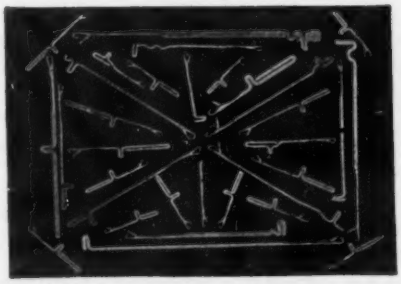
AND ALL BRAIDED FABRICS.

TRY OUR "SUPERIOR" OR SUNKEN RIVET-HEAD NEEDLES

They will save you money.



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Manufacturers of Knitting Machine

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EXCELSIOR NEEDLES.

The best Hosiery Needles in the market.

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AND BURR BLADES OF ALL KINDS.

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Manufacturers of

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The Largest Manufacturers of Machine Needles in the World.

STANDARD TRADE MARK.

Longer Wear. Better Work.
Less Mending. Fewer Seconds.
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Patent and Regular Latch Needles

Needles for all makes of Knitters and Ribbers.
Keystone Spring Bottom Needles for all makes of Knitting Machines always in stock for immediate delivery.
Special Needles made to order.

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RIVETS GUARANTEED. Samples on application. SPRING NEEDLES A SPECIALTY.

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4,000 H.P., 72 ft. head, arranged to drive generator and a single turbine to drive exciter. Five settings built for the Hudson River Water Power Company's Spier Falls plant and 14 pairs 51 inch for their plant at Mechanicsville, N, Y.

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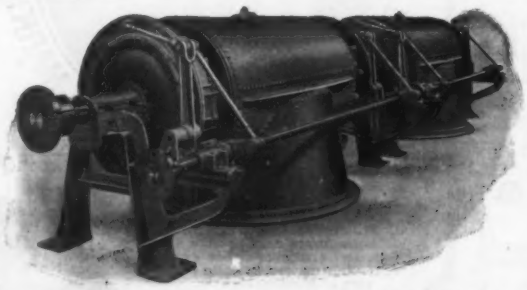

2 PAIRS OF IMPROVED NEW AMERICANS ON ONE SHAFT.

The High Speed, Power, Efficiency and Durability of the

IMPROVED NEW AMERICAN TURBINE

ADAPT IT TO ALL CONDITIONS.

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The Dayton Globe Iron Works Co.
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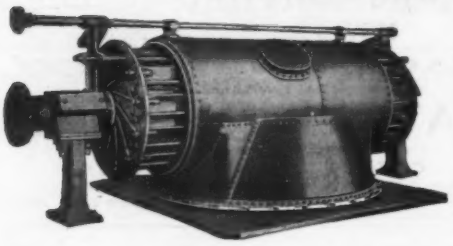
SAMSON TURBINE



AN EVEN and REGULAR SPEED under all CHANGES of LOAD is always desirable. This condition combined with a QUICK SPEED and HIGH EFFICIENCY makes a combination hard to beat. The SAMSON maintains all these conditions under the most severe tests.

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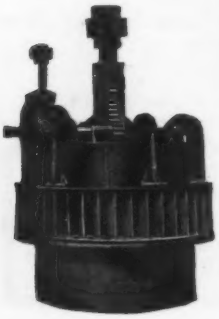

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RISDON CELEBRATED TURBINE
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On Horizontal or Vertical Shafts.

These Turbines are recognized as the most effective water wheels made. Your inquiries should come direct to us for this class of machinery.

Pure air is as essential to health and comfort as pure food

but the supply is not assured by Government inspection.

It is, however, a "sure thing" with the "ABC" Fan System of Heating and Ventilating.

The apparatus used is described in Catalogue 186 TR. Shall we send you a copy?

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This is the title of a little booklet telling how to preserve all belts and prevent slipping. Write for free copy and mention this paper.

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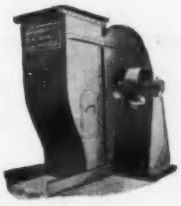
FIRE BRICK AND CLAY RETORTS

CONSULTING ENGINEERS AND OWNERS

WILL FIND OUR



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MASSACHUSETTS FAN CO.
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You Save Enough Insurance to Pay for the Equipment.

So it costs you NOTHING to have the AMERICAN WATCHMAN'S CLOCK. Fully approved by all insurance companies. We equip factories with Fire Alarms, Signals, etc., also Employee's Time Recorders and Telephone Systems. Electric Time System consists of Master Regulator in office with secondary electric clocks throughout the mill, insuring accurate time. Send for particulars.

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Cleans Wool, Floors, Anything.

INDIA ALKALI WORKS, Boston.

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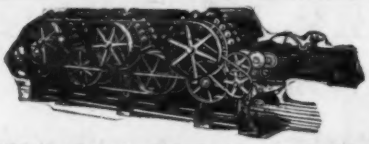

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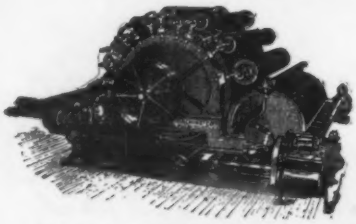
For reducing to Fibre Cotton and Wool Waste, Cloth Clippings, Etc.



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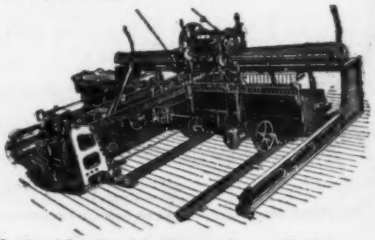

Including Rag, Wool and Burr Pickers, Wool, Worsted and Shoddy Cards, Mules, Yarn Twisters, Warpers, Dressers, Spoolers, Etc.

Complete Equipment for Manufacturing Cotton Batting for All Purposes.

Special Carding and Spinning Machinery for manufacturing Yarn from such low grade stock as Mill Sweepings, Linters, Etc.

We reclothe or furnish new Metallic Toothed Cylinders and Rolls and relagg or furnish new Cylinders for any make of Rag Picker.

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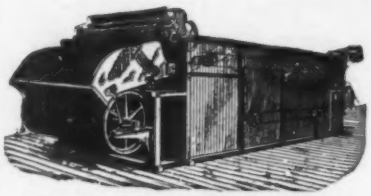
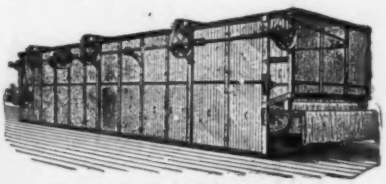
"CYCLONE" DRYERS

For Cotton Stock, Wool Stock, Rags, Yarn, Cloth
Underwear, Stockings, etc.



Automatic Cotton or Wool Stock Dryer.



Automatic Yarn Dryer.

Steel Bladed Ventilating Fans.

Iron Bowl Yarn Scouring Machines.

Complete Carbonizing Outfits for Wool, Rags or Cloth.

THE PHILADELPHIA TEXTILE MACHINERY CO.,

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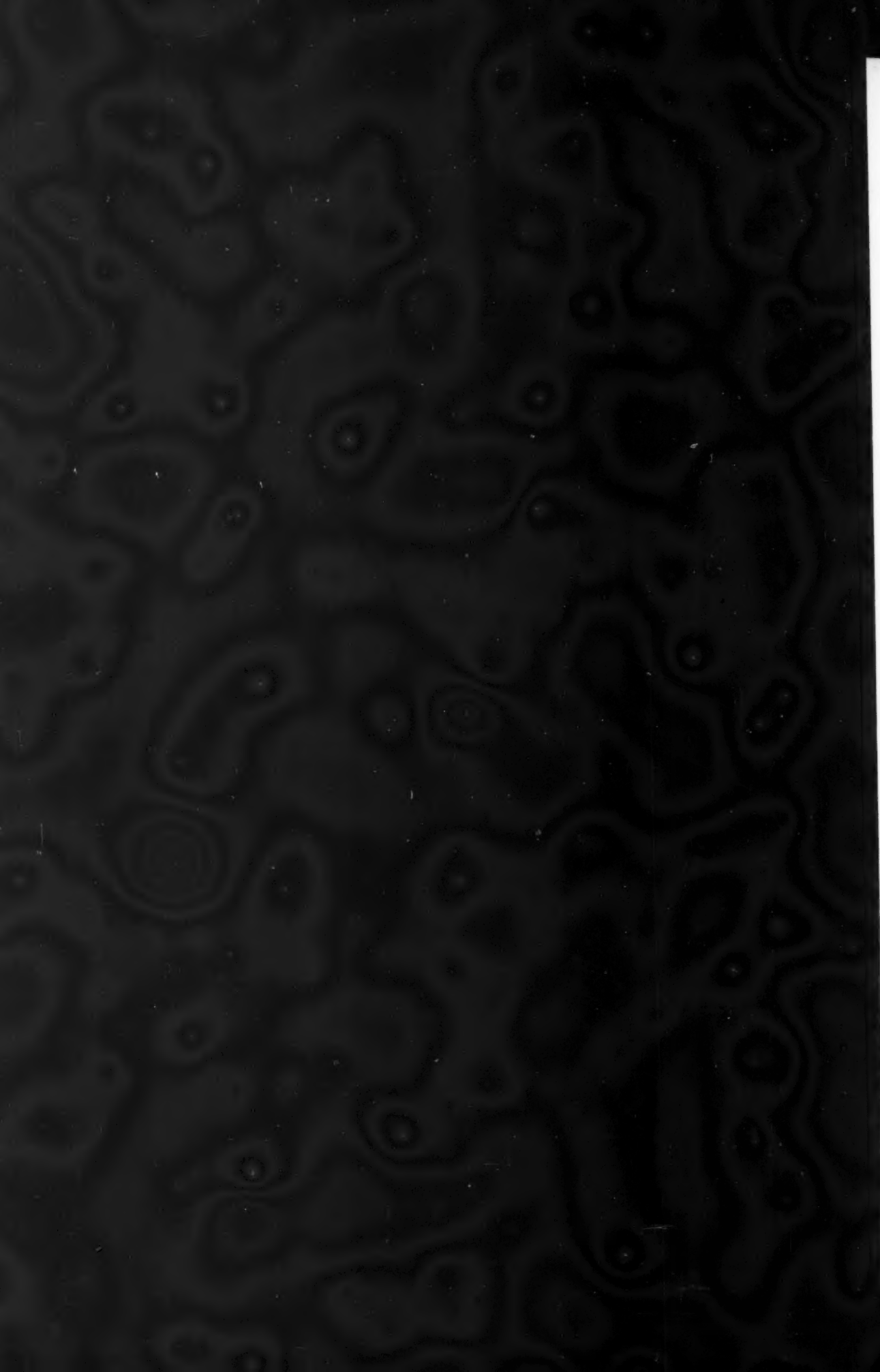

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TAUNTON, MASS.

THE completion of this Company's new plant at Taunton forms one more step in the rapid advance of the Cell Drier.

Simplicity.

Economy of First Cost, Space, Labor and Power.

Best Materials and Workmanship.

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